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SUMMARY OF RECENT ABSTRACTS*

III. MALARIA

[*Continued from p.* 182]

Treatment

In a general account of malaria COVELL (p. 103) makes the point that in grave cases delay in treatment because of negative blood films may be disastrous. He discusses the various drugs now used for treatment and prophylaxis, and includes blackwater fever in his account. The paper is an excellent summary of modern practice, and should be read in full.

LAVIER and SCHNEIDER (p. 115) emphasize the importance of determining the species of parasite in children. *Plasmodium falciparum* infection can usually be cured with a schizonticidal drug, but *P. malariae* and *P. vivax* need longer treatment followed by one of the 8-aminoquinolines.

Work on proguanil has continued. NAIR *et al.* (p. 1100) have established its toxic doses, both acute and chronic, in monkeys. A study of the therapeutic effect of proguanil and pamaquin, separately or together, has been made by RAY *et al.* (p. 1100) in monkeys infected with an attenuated strain of *P. knowlesi*. The action of proguanil in simian malaria is definitely slow, and JASWANT SINGH *et al.* (p. 19) think that it is unsuitable for acute malaria with cerebral involvement.

MACDONALD and RAO (p. 10) gave a single dose of proguanil (300 mgm. for adults) in treatment of patients on an estate in Ceylon, but there was a high readmission rate. Since transmission there is now rare they suggest that treatment should aim at radical cure, for which the single-dose method is not suitable. RAMAKRISHNAN *et al.* (p. 924) show that a single dose of 300 mgm. to men with *P. falciparum* malaria may render gametocytes non-infective to mosquitoes for a few days, but afterwards they become infective again. Similarly, a weekly dose of 100 mgm. is unable to prevent infection of mosquitoes. NAJIB KHAN *et al.* (p. 663) in India show that proguanil clears the blood more quickly than mepacrine, or mepacrine and quinine together, though the period of pyrexia is longer with proguanil.

* The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1952, v. 49. References to the abstracts are given under the names of the authors quoted and the pages on which the abstracts are printed.

DESAI (p. 364) observed that relapses occurred in patients with *P. vivax* infection treated with mepacrine and subsequently given proguanil 0·3 gm. once each week for 6 months ; relapse occurred soon after the last dose.

In troops operating in a certain area of Malaya WILSON *et al.* (p. 599) have obtained evidence which suggests that the local *P. vivax* is at least partly resistant to proguanil. They also note that resistant *P. falciparum* had previously been found in the same area.

CARRINGTON *et al.* (p. 362) have isolated a metabolite from proguanil which has a high anti-malarial activity. The bromine analogue of proguanil, bromoguanide, has some action on certain fowl and monkey malaria parasites, but is not so effective as proguanil (JASWANT SINGH *et al.*, p. 122). CHAUDHURI *et al.* (p. 1098) treated malaria with a new chloro derivative of proguanil, which was more active and more toxic than proguanil in animals. Its action in the doses used was slow and it seemed to have no advantage over proguanil. Some unpleasant side-effects were noticed.

Chloroquine is widely used. MERLAND and CRESTÉ (p. 363) find no indication that nivaquine is excreted in human milk. MOHR (p. 842) regards chloroquine (Resochin) as the best and quickest of modern drugs, and he gives 2·5 gm. in 24 hours, to be followed by a 3-day course of plasmoquine. VILA CORO (p. 230) gives a single dose in acute attacks in children in Spanish Guinea, where malaria is the main cause of infant mortality, and effective immunity against *P. falciparum* takes many years to become established. BOURDIN (p. 231) advocates it in the New Hebrides for treatment (radical cure in *P. falciparum* infections) and suppression ; relapses occur in *P. vivax* infections, but not during the course of suppressive administration. CANET (p. 232) uses nivaquine [presumably chloroquine] in suppositories for *P. falciparum* in children, with results similar to those obtained by oral administration.

LOUGHLIN *et al.* (p. 751) have used hydroxychloroquine for single-dose treatment of *P. falciparum* malaria, in a dose of 2 gm. for adults, and report favourably on it.

In a therapeutic trial of several drugs in India, CHAUDHURI *et al.* (p. 595) concluded that chloroquine and camoquin were the drugs of outstanding value ; the action of proguanil was less rapid, and resistant forms of *P. falciparum* were encountered. For suppression, again, chloroquine and camoquin were most satisfactory. Details are given of the various dosages recommended.

Several reports indicate that a single-dose treatment with camoquin by mouth is effective (KHAN *et al.*, p. 363 ; HOEKENGA, p. 1097). WALLACE (p. 231) in a semi-immune population in Malaya follows this with mass suppression with proguanil ; in comment Covell suggests that treatment with mepacrine followed by mass suppression would be even cheaper. INDER SINGH and KALYANUM (p. 1096) report favourably on 2 doses of camoquin, of 0·5 gm. each.

A single intravenous treatment with camoquin (150 mgm. of base) has been used in 5 cases of *P. vivax* infection (with 2 relapses) by PAYNE *et al.* (p. 481), and VILLAREJOS (p. 482) gave 10 mgm. per kgm. body weight of the salt by mouth successfully in *P. falciparum*, and with reduced relapse rate in *P. vivax* infection.

Pyrimethamine (Daraprim) has been tested in several places. In Nigerian schoolchildren it cleared the blood of *P. falciparum* trophozoites (but not gametocytes) in single doses as small as 25 mgm.—or even 5 mgm. It has a similar but slower action on *P. malariae* (ARCHIBALD, p. 11). In Gambia MCGREGOR and SMITH (p. 663) find it useful, resembling proguanil in its effect on clinical symptoms, and intermediate between proguanil and chloroquine in rapidity of action. SCHNEIDER *et al.* (p. 666) tested it against *P. berghei* and

P. gallinaceum, and (p. 664) in a large number of patients in Tunisia and Indo-China. A total dose of 50 mgm. was usually satisfactory, and 50 mgm. on each of two days was as effective as any larger dosage used. It compared well with proguanil and chloroquine in *P. vivax* and *P. falciparum* malaria, but its value in producing radical cure could not be assessed. There were no signs of toxicity. Foy and Kondi (p. 842) show that it has a pronounced effect in rendering gametocytes of *P. falciparum* non-infective to *Anopheles gambiae*.

Dockeray (p. 114) reports deaths in two African infants suffering from pneumonia, who were given intramuscular injections of mepacrine, 300 mgm. in mistake for 100 mgm., on suspicion of malaria.

van Rooyen (p. 1098) has given hypertonic saline intravenously in cerebral malaria, with good effect. He claims that it frees the cerebral capillaries from clogging by sporulating parasites.

Antibiotics have been tried. Aureomycin has some action, but is slow (Nor El-Din, p. 116) ; terramycin seems to have some effect in man (Ruiz-Sanchez *et al.*, pp. 12, 597) and in *P. berghei* infection of mice (Levaditi and Vaisman, p. 1101), but is not likely to be very useful.

Fawaz and Haddad (p. 11) show that the naphthaquinone derivative Lapinone has a definite action on *P. vivax* ; it must be administered parenterally.

Kass *et al.* (p. 482) show that ACTH reduces resistance to malaria, and discuss the mechanism.

Nor El-Din (p. 232) has used Abadol, an anti-thyroid drug, in malaria, with results which Covell finds unpromising.

Cortisone has a deleterious effect in *P. berghei* infections of mice, and Findlay and Howard (p. 672) suggest that care should be exercised in using it in human malaria. It also has a deleterious action in *P. relictum* (Redmond, p. 672) and *P. cynomolgi* infections (Schmidt and Squires, p. 237).

Suppressive Treatment

A Commission detailed to study malaria control in the Belgian Congo (p. 364) reports on drug suppression to the effect that this is indicated for Europeans and certain categories of Africans, including infants who can be followed, migrant labourers from healthy areas, and the people of places where epidemics are common.

Merle (p. 598) states that malaria has been responsible for a very large number of abortions, premature births and still-births in Brazzaville, and he shows that if proguanil is given once each week in the later months of pregnancy the numbers of abortions and still-births are considerably reduced. Proguanil given to schoolchildren also reduces the parasite and spleen indices. Johnstone (p. 361) has studied the failures of proguanil suppression in troops in Kenya, which averaged 100 per 1,000 per annum, reaching 268 in one period. Many broke through after the onset of other diseases, but in some, even with satisfactory history of taking the drug, *P. falciparum* infections appeared without obvious reason. Further investigation is needed. Gunther *et al.* (p. 666) in New Guinea observed a number of cases in which malaria broke through in spite of proguanil, and they regarded this as indicating the increasing presence of resistant strains of malaria parasites, a conclusion which Covell, in comment, does not accept on the evidence presented.

In an investigation of proguanil suppression in Assam, the doses being 100 mgm. twice each week or 300 mgm. once each week, Gilroy (p. 1025) found no significant correlation between the occurrence of parasites in the blood and the presence or absence of the drug in the urine ; parasitaemia appeared to depend to some extent on the spacing of doses and the amount of exposure to infection. There was no evidence of drug-resistant strains of the parasite.

RULE (p. 597) made a study of the effect of weekly doses of chloroquine in a small group of African children in the Belgian Congo. The study was continued for a year, and showed that the drug was very effective in suppressing clinical malaria and reducing parasitaemia in this highly infected community. Children under 2 years need relatively larger doses than older children. Trials in a highly malarious area of Formosa indicate that for prophylaxis chloroquine should be given in weekly doses of 5 mgm. base per kgm., and for treatment in a *total* dosage of 50 mgm. base per kgm. (WATSON *et al.*, p. 12).

GOODWIN (p. 664) tested the suppressive properties of Daraprim on himself while working in East Africa, and found that a dose as low as 5 mgm. each day was effective even after he had been bitten by 4 *A. gambiae* proved to be infective. There were only a few minor toxic symptoms in volunteers on doses of 50 mgm. twice each week.

In a group of small villages in the Belgian Congo VINCKE (p. 751) gave Daraprim, 25 mgm. once each week, to the people, irrespective of age, and continued through 2½ months of the heaviest malaria period. Parasite indices fell to very low figures and the sporozoite index of *A. funestus* fell from 7·1 to 0·69 per cent.

Repellents

An extensive test has been made by TRAVIS (p. 13) of repellents for anophelines. Good reports are given of dimethyl phthalate and of Mixture 6–2–2 (6 parts of dimethyl phthalate, 2 of Repellent 6–12, and 2 of Indalone) but several new compounds were found useful also. SMITH and COLE (p. 13) give an account of work on repellents for application to clothing ; several new compounds are commended.

Control

General

SWELLENGREBEL (p. 589) elaborates the warning he has previously given that in hyperendemic areas measures which tend to reduce transmission may reduce the immune status of the people, and that the effects may, in fact, be deleterious. In comment, Macdonald draws different conclusions from the papers quoted, and, in taking this different point of view, mentions the need for thorough investigation in places where there is a high degree of immunity.

HACKETT (p. 1026) discusses the disappearance of malaria in Europe and the United States.

The Government of Egypt (p. 600) have issued an account of the invasion of Egypt by *A. gambiae* in 1942–45, and the operations of the eradication service.

A note on the difficulty of any scheme of malaria control in Italian Somaliland is contributed by LIPPARONI (p. 843).

A booklet on malaria and its prevention has been issued by the Department of Health, Southern Rhodesia (p. 366).

In a paper on malaria control in the copper belt of N. Rhodesia BIRT (p. 752) points out first that the mining townships were deliberately sited to avoid malaria, and second that the mining companies early organized anti-malaria departments which suppressed breeding places and exploited insecticides—pyrethrum and the later preparations. The incidence of malaria in Europeans has now fallen to 5·65 per 1,000 per annum against about 750 in early days, and 240 in 1949.

JASWANT SINGH (p. 1099) sums up his recommendations for malaria control in India. In part of India *A. sundaicus* was found to breed only in stagnant water, and VENKAT RAO (p. 924) succeeded in controlling breeding by combining a slow current in drainage ditches with periodical drying of tanks and pits to reduce vegetation.

A circular issued by the Malaria Advisory Board of the Federation of Malaya (p. 1098) deals with all aspects of malaria control, and DUNCAN (p. 929) has written a historical account of malaria control at the Singapore Naval Base.

EJERCITO (p. 601) has found in the Philippine Islands that agricultural measures taken to improve rice country have incidentally controlled malaria carried by *A. minimus flavirostris*.

An account of the activities of the National Malaria Society, and the part it has played in the elimination of malaria from the United States, has been written by ANDREWS (p. 754). The Society has now amalgamated with the American Society of Tropical Medicine. Reviewing the progress of malaria control in the Tennessee Valley, DERRYBERRY and GARTRELL (p. 930) conclude that naturalistic control and much of the foundation for artificial controls should be part of the initial planning for all schemes of conservation of water in malarious areas. They believe that *A. quadrimaculatus* larvae have developed tolerance to DDT larvicides in this area.

Larvicides

In a search for substitutes for mineral oils VENKATARAMANAN (p. 121) has found that most of a number of vegetable oils tested were too viscous to enter the tracheae of mosquito larvae, but two essential oils, pine oil and lemon-grass oil, were effective in doses smaller than those necessary with malariol.

KELLER *et al.* (p. 235) have measured the toxicity of various insecticides when applied in emulsions or oil solutions to larvae in the laboratory and in the field. All were more effective as emulsions than as oil solutions. REID and WHARTON (p. 1100) tested various larvicides against *A. maculatus* breeding in flowing water in Malaya. DDT, either as oil solution or as emulsion, was effective and was the cheapest to use. On the whole a 25 per cent. emulsion concentrate was best, and was diluted with water on the spot so that 25 gallons of the mixture per acre gave a dose of 4 oz. DDT. The use of larvicides has become necessary in Mauritius, where *A. gambiae* has persisted in spite of residual spray campaigns, first with BHC and then with DDT wettable powder ; DDT solution was also used. *A. gambiae* continued to be found in unsprayed new houses and in cowsheds throughout the coastal zone, and DOWLING (pp. 234, 367, 1026) shows that the method of attack was supplemented by the application of larvicidal oil containing DDT to the permanent breeding waters along the coast. RANKINE (p. 366) writes to the same effect, and comments that old methods are not obsolete, and the maintenance of existing anti-larval works must be ensured.

MARKOS (p. 16) has studied the mosquitoes breeding in rice fields in California. The centres of the fields breed as prolifically as the edges, and control is possible only from the air. In this way DDT and DDD emulsions gave good control for 1–2 weeks.

Insecticides

General.—RUSSELL (p. 14) sums up the epidemiological implications of the various residual spray campaigns in relation to malaria, and concludes that it is now reasonable to envisage the elimination of malaria from the world, as a public health problem. ROZEBOOM (p. 839), however, makes the interesting speculation that the use of residual insecticides may favour the natural selection of mosquitoes which feed and rest out of doors, and in this way transfer the site of transmission of malaria from inside to outside of dwellings [see GEORGOPOULOS, below].

CLAVERO (p. 116) gives an account of malaria and its vectors in Spain, and of the residual insecticide campaigns undertaken to control it. A special feature is made of treatment in spring of persons who suffered attacks during the previous year.

VITULLO (p. 1099) tells the story of malaria control in the Roman countryside, and the remarkable success of residual insecticides.

The Commission detailed to study malaria control in the Belgian Congo (p. 364) states that it is not yet possible to eradicate the vectors from the whole country, but for urban areas residual spray should be instituted, and pilot schemes should be started in certain designated rural areas where extensive campaigns would be possible. This work should be carried out within the framework of the existing medical service, but should be directed by specially deputed doctors. An estimate is given of the organization appropriate for residual insecticide work in Leopoldville.

In the Report of the Malaria Division, Trinidad and Tobago, for 1950 (p. 16) it is shown that incidence is falling, DDT spray is used, bromeliad malaria is controlled by spraying the host plants with copper sulphate and by manual removal, and by these measures, and by permanent drainage and oiling, malaria has been brought to a low level. There is a note that *A. aquasalis* covers many races of varying vector capacities. A general account, for non-medical readers, of the methods employed in the control of *A. darlingi* in British Guiana has been written by GIGLIOLI (p. 662).

The reactions of mosquitoes to residual insecticides have received considerable attention. REID (p. 235) makes the point that susceptibility to control by DDT depends largely on the habits of the mosquitoes, which govern the opportunities for making contact with the toxic residues. In Malaya *A. maculatus* appears to be very susceptible in this sense, *A. umbrosus* and *Mansonia* spp. rather less so, *A. barbirostris* and *A. sundaicus* less so, and *A. letifer* even less. *Culex fatigans* and *C. vishnui* suffer very little. Similarly, WHARTON (p. 360) concludes that eradication of Malayan anophelines is not possible by house spraying alone because they leave houses shortly after feeding, though a considerable reduction in *A. maculatus*, which is very susceptible to DDT and BHC, may be achieved. In Brazil DE BUSTAMANTE *et al.* (p. 17) have observed that although *A. darlingi* normally feeds in houses, it tends to be deterred (more than *A. albitarsis*) from entering houses which have been sprayed regularly with DDT.

In view of the great saving in cost which might be effected by a single large application of DDT residual spray rather than several smaller ones in the same period, VISWANATHAN and GADRE (p. 118) examined the deposits left at various periods after application of 168 mgm. per sq. ft. either as a single dose, or divided into 2 or 3 doses at intervals of 6 weeks. There was no indication that the single large dose was better than the repeated smaller doses.

KRUSE and KONCHADY (p. 119) recognize the rapid loss of toxicity of uncoated mud or clay walls after application of DDT, and the fact that a thatch roof remains toxic much longer although deposits of soot may reduce toxicity. Unlike VISWANATHAN *et al.* (p. 118) they prefer water-wettable suspensions of DDT rather than emulsions. RAFI and SHAH (p. 368) also express preference for 50 per cent. wettable DDT, and this is largely used in Mauritius (DOWLING, pp. 234, 367).

In a long monograph MACKERRAS *et al.* (p. 119) give an account of experiments carried out in Australia and New Guinea on the spraying of DDT oil solutions from Service aircraft for the control of mosquitoes and house-flies. Details are given of the techniques developed and the conditions under which optimum results are obtained. The point is made that only 28 to 53 per cent. of the oil released from aircraft actually reached the targets.

DDT.—The question of resistance of mosquitoes to DDT has been discussed. TRAPIDO (p. 15) failed to find evidence of it in *A. claviger* in Sardinia, but in Greece GEORGOPOULOS (p. 928) shows that DDT is now less effective against *A. sacharovi* than it was a few years ago. The observation has been made,

however, that the habits of this mosquito have changed in that it now prefers to rest in untreated places such as caves, bushes, outbuildings and bridges [see ROZEBOOM, above] ; no laboratory work was done to support the theory of resistance. BELIOS (p. 357) tells the story of the great decline of malaria in Greece since DDT was used.

The widespread use of DDT residual spray continues, and the following favourable reports on it have been published :—

GARRETT-JONES (p. 483) in Iran ; definite and rapid decline in *A. maculipennis maculipennis*, some of which must, however, have been seasonal.

JADIN (p. 928) in the Belgian Congo ; considerable reduction in *A. funestus* (and its breeding) and *A. gambiae* ; marked decline in parasite rates of people over 1 year of age.

MERCIER (p. 752) in Madagascar (Tananarive) ; great reduction in malaria mortality and general mortality especially at age 1–5.

DOWLING (pp. 234, 367, 1026) ; RANKINE (p. 366) in Mauritius ; *A. funestus* and *Aëdes aegypti* apparently eliminated, but *A. gambiae* persists ; malaria, and general and infant mortality rates, have been enormously reduced. Total annual cost a little over 3 shillings per person.

NASIR-UD-DIN (p. 843) in East Pakistan ; one annual round of spray treatment will probably break the cycle of transmission.

RAFI and SHAH (p. 368) in the Punjab.

VISWANATHAN *et al.* (pp. 118, 359) in Indian villages ; considerable reduction of *A. culicifacies* and *A. fluviatilis* in the sprayed villages; no evidence of repellent effect. DDT emulsion was the most satisfactory preparation.

CULLUMBINE (p. 222) in Ceylon ; considerable reduction in infant mortality (from prematurity, debility and convulsions, but not from gastro-enteritis, bronchitis and pneumonia) and in general malaria death rate.

KAR (p. 235) in Assam ; malaria reduced by one half, and a marked decrease in other diseases.

VAN THIEL and WINOTO (p. 369) in Java ; most successful against *A. sundaicus ;* great reduction in parasite rates.

VAN GOOR and LODENS (p. 930) in Indonesia ; apparent success against *A. aconitus* in rice-field areas.

MACKERRAS *et al.* (p. 119) in Australia and New Guinea ; sprayed from aircraft with success against mosquitoes and flies.

DOWNS *et al.* (p. 16) in California ; dramatic success.

DOWNS and BORDAS (p. 601) in Mexico ; control of *A. aztecus* is complete ; one application every 2 years will probably be enough.

MEXICO, Public Health Authority (p. 754) ; successful results.

CALERO ELORDUY (p. 755) in Veracruz ; malaria practically eliminated, but although DDT was of great service, it should not be given all the credit.

SAUTET (p. 1027) in Guadeloupe ; encouraging results against *A. aquasalis* and *A. albimanus*.

GABALDON (p. 1027) in Venezuela ; marked decrease in malaria ; *A. darlingi* can be eradicated and *A. albimanus* reduced in numbers.

BRITTO and COTRIM (p. 592) in W. Brazil ; great improvement.

DE CARVALHO and RACHOU (p. 1021) in Brazil (State of Rio de Janeiro) ; incidence fell from 33,809 cases in 1945 to 687 in 1949.

GUTIÉRREZ F. *et al.* (p. 121) in Chile ; no autochthonous cases (in the part of Chile treated) since DDT spray was used ; some sporadic breeding of *A. pseudopunctipennis* persists.

BHC has been used in several investigations :—

MANDOUL and JACQUEMIN (p. 233) in Ouargla, Algerian Sahara ; spectacular results against *A. multicolor* ; control of breeding and suppressive drugs were also used.

DAVIDSON (p. 117) in Kenya ; BHC is better than DDT (which is more irritating to *A. gambiae* and *A. funestus*) and causes higher mortality ; BHC has some effect even at 6 months.

ALVES (p. 15) in S. Rhodesia ; BHC is effective for 13 weeks or more at a dose of 46 mgm. gamma isomer (370 mgm. water-dispersible powder) per sq. ft. ; results excellent.

JASWANT SINGH *et al.* (p. 753) in India ; little difference between DDT suspension at 50 mgm. per sq. ft. and BHC (gamma isomer) at 10 mgm., but best results with a mixture of DDT 25 mgm. with BHC 5 mgm., which was effective for 2 months.

GILROY (p. 844) in Assam ; gamma BHC at 20 mgm. per sq. ft. gives the best results (mortality of 97 per cent. of the anophelines at 15 weeks) ; local conditions may require 6-week cycle, when 10 mgm. BHC or 45 mgm. DDT are equally suitable.

RAJENDRAM and JAYEWICKREME (p. 667) in Ceylon ; dramatic reduction of malaria by DDT and BHC, but eradication of all anophelines is not in sight—great reduction in *A. culicifacies*, but *A. hyrcanus* and *A. vagus* are not house haunters.

FLOCH (p. 236) in French Guiana ; DDT supplemented by BHC with reduction in malaria.

ARAGÃO (p. 484) has used copper aceto-arsenate for the control of anophelines of the sub-genus *Kerteszia*, with success.

Plasmodia of Monkey Malaria

JASWANT SINGH *et al.* (p. 369) show that with *P. knowlesi* in monkeys the incubation period, intensity and course of the infection are directly influenced by the dose of sporozoites.

JASWANT SINGH and NAIR (p. 122) observe that leucocyte counts in rhesus and sinicus monkeys are much less reliable than red cell counts in calculating densities of blood parasites.

HAWKING and THURSTON (p. 931) found that quinine and mepacrine did not destroy pre-erythrocytic forms of *P. cynomolgi*, but chloroquine might have some effect. Proguanil given in the pre-patent period prevented detection of these forms but did not eradicate the infection. Pamaquin destroyed them and prevented infection. These results resemble those obtained in *P. vivax* infection of man.

GARNHAM (p. 236) has transmitted *P. inui* through *A. maculipennis atroparvus*, and has found the pre-erythrocytic forms of this quartan parasite of monkeys in the parenchyma of the liver cells. INOKI (p. 370) claims to have found exo-erythrocytic forms of " *P. inui* var. *cyclopis* " in the reticulo-endothelial cells of monkeys, but in comment Garnham suggests that they were probably erythrocytic parasites undergoing phagocytosis. INOKI *et al.* (p. 370) claim that the asexual life cycle of the parasite they name " *P. inui* var. *cyclopis* "

lasts 48 hours [but Garnham points out that *P. inui* itself has a cycle of 72 hours, and suggests that the parasite now described belongs to the *P. cynomolgi* group].

DA FONSECA (p. 934) describes a parasite from a Brazilian monkey, which he regards as a new species, and names *P. simium*.

Plasmodium berghei

A great deal of work has been done on *P. berghei*. YOELI and WALL (p. 372) have obtained infection in about 60–70 per cent. of *A. stephensi*, *A. maculipennis atroparvus* and *A. quadrimaculatus* kept at 26-27°C., and (p. 932) have successfully carried out cyclical transmission. On the other hand RODHAIN and VINCKE (p. 932) obtained infection in only 3 per cent. of *A. m. atroparvus* kept at 23°–24°C. The reason for this discrepancy is not evident.

MERCADO and COATNEY (pp. 670, 844) show that though blood-induced *P. berghei* infection in white mice was invariably fatal, in young white rats two types were seen, one fatal and the other tending towards recovery. In rats the parasite has a predilection for immature erythrocytes, which are rather larger than mature cells (CORRADETTI and VEROLINI, p. 371). Recrudescences in rats have been studied by BLACK (p. 932).

FABIANI and his colleagues (p. 485) have successfully inoculated *P. berghei* into white rats or mice by many routes, including the lungs and (p. 485) through scarified skin. They (p. 669) have given it into the heart to produce infection without the usual latent period, and (p. 670) by this method have found that rats which have recovered from previous infection are refractory. They have also (p. 670) given massive doses into the peritoneal cavity, and have obtained rapid results. They (p. 484) discuss the pre-patent period in relation to quantity and quality of inocula. They also (p. 484) note that splenectomy, in white rats which have apparently recovered spontaneously, often causes relapse [see also ZUCKERMAN and YOELI, below], but they show that it also brings out heavy and sometimes fatal infection with *Bartonella muris ;* this should be borne in mind when results are being interpreted. They (p. 671) have removed the suprarenals of infected rats, but found that this rarely activates a latent infection if the spleen is intact. Workers of this group have demonstrated congenital malaria in a few of the progeny of rats and mice infected early in pregnancy (p. 486). They (p. 602) have studied the complement-fixation reaction before and after the crisis of *P. berghei* infection and have used an antigen from infected liver to study the variations in antibody and complement.

RAMAKRISHNAN and SATYA PRAKASH (pp. 371, 372) discuss the refractoriness occasionally shown by albino mice to *P. berghei*, and the behaviour of the parasite in various rodents. The periodicity is 24 hours. Guineapigs are refractory, and SERGENT and PONCET (p. 756) have shown that after inoculation the parasites disappear between the 2nd and 4th days. But though adult rabbits are refractory, DESCHIENS and LAMY (p. 237) successfully infected new-born rabbits.

Infection with *P. berghei* in *Meriones shawi* is apparently transient, but SERGENT and PONCET (p. 756) have shown that it may remain latent for as long as 3 years. In *Microtus guentheri* the infection is usually benign, with mortality of 22 per cent., but ZUCKERMAN and YOELI (p. 671) show that the defence mechanism, both natural and acquired, is seriously inhibited if the spleen is removed.

WHITFELD (p. 931) has studied the nucleic acids of the blood stages of *P. berghei*.

BALDI and DELLA ROCCA (p. 602) tested a number of drugs in *P. berghei* infections of rats ; chloroquine and camoquin were the most effective.

BLACK (p. 238) shows that neoarsphenamine has some action, which is partly antagonized by BAL.

Plasmodia of Bird Malaria, etc.

STAUBER *et al.* (p. 124) have devised a technique for agglutinating erythrocyte-free avian plasmodia. Antisera prepared by injection of parasites in rabbits or ducks agglutinate parasites freed from red cells, and both group and specific agglutinins are found. It may be possible to differentiate strains of a single parasite by this method.

INOKI (p. 373) suggests that when once tissue forms of bird malaria parasites become adapted to a certain organ, then other organs will rarely be attacked.

TREMBLEY *et al.* (p. 122) report observations on strain differences of *P. gallinaceum*. One strain did not form erythrocytic parasites, another did not produce exo-erythrocytic forms. Alterations occurred on passage through mosquitoes. The papers should be read in full.

CAVACEPPI (p. 486) shows that exo-erythrocytic forms of *P. gallinaceum* cease to be found 25 days after inoculation, but erythrocytic development continues. The author concludes that the erythrocytic stages alone are responsible for maintaining the infection and producing relapses. ODDO and BRUNO-SMIRAGLIA also (p. 845) conclude from a study of pigment, and of the various stages of the parasite, that latent infections and relapses can be accounted for by persistence of the erythrocytic cycle alone, in the internal organs.

KRUSZYŃSKI (p. 603) has studied the distribution of mineral components in *P. gallinaceum* and in red cells parasitized by it.

DE OLIVEIRA (p. 373) has cultivated exo-erythrocytic forms of *P. gallinaceum* in tissue culture of macrophages.

EYLES (p. 239) records a statistical study of *P. gallinaceum* infection of *Aëdes aegypti*.

In a study of sporozoites of *P. gallinaceum* PORTER *et al.* (p. 1102) subjected them to various conditions and observed the results of subsequent inoculation by different routes.

RAO *et al.* (p. 123) describe a method for preparing concentrates of malaria parasites from chicks infected with *P. gallinaceum*, of which details are given in the abstract.

COFFIN (p. 238) describes the preparation of a vaccine of washed erythrocytes of birds heavily infected with *P. lophurae* or *P. gallinaceum*; the vaccine was kept in 0·1 per cent. formol saline, washed again and mixed with an adjuvant, and was used on the day of preparation. Considerable immunity was provoked, and even cross-immunity, but it was noticed that increased resistance to *P. gallinaceum* was also induced by injection, into chicks, of normal chicken red cells in a similar emulsion. The same author (p. 239) has demonstrated passive immunization by injection of serum of infected birds.

TAYLOR *et al.* (p. 674) have devised a method for testing drugs against *P. gallinaceum in vitro* and assessing the results by inoculating the treated blood into young chicks. Some drugs (chloroquine, mepacrine, quinine) act at similar concentrations *in vitro* and *in vivo*, indicating that no degradation takes place. Others (pamaquin, proguanil and some others) show little activity *in vitro*, suggesting that metabolites are formed *in vivo* which are the active substances. SCHMIDT *et al.* (p. 1025) show that although certain metabolites isolated from human urine and rabbit faeces after treatment with proguanil are much more active than proguanil against *P. gallinaceum* in chicks, this is not the case when they are used in *P. cynomolgi* infection of monkeys.

Sicca (p. 487) reports on chloroquine in treatment and suppression of *P. gallinaceum* infections.

Commenting on his failure to induce resistance to chloroquine in *P. gallinaceum*, Seaton (p. 240) suggests that resistance to proguanil may develop because it interferes with one enzyme system in the parasite, whereas chloroquine may interfere with several. Bishop and McConnachie (p. 673) have also failed to produce resistance of *P. gallinaceum* to chloroquine, but have produced some degree of resistance to pamaquin. This entailed some resistance to pentaquine and quinine also, but not to proguanil, mepacrine, chloroquine or sontochin.

Terzian *et al.* (p. 486) have obtained evidence which suggests that the effectiveness of drugs against sporozoites of *P. gallinaceum* is related to curative effect in *P. vivax* infections of man. Tests are made by feeding infected mosquitoes on sugar solution containing the drugs.

Terzian *et al.* (p. 846) show that when certain substances (sulphonamides, etc.) are given to mosquitoes before infective blood meals, the numbers of oöcysts (*P. gallinaceum*) which develop may be greater or less than those in controls, depending on the drug used and its dose.

A latent state is observed in *P. cathemerium* infections of birds, and eradication of the parasites is very difficult. Hanson and Tatum (p. 846) conclude that some parasites are inaccessible to drugs and act as the source of blood infections.

In a study of *P. relictum* infection in canaries Sergent and Sergent (p. 933) have found that some 80 per cent. which survive the acute attack remain carriers of the infection. Hunninen (p. 373) shows that *P. relictum* can develop in certain American anophelines. Sergent and Poncet (p. 934) have studied the simultaneous infection of canaries with *P. relictum* and *P. rouxi*.

Tokura and Kawahata (p. 374) report observations on *P. elongatum*.

P. juxtanucleare is common in fowls in part of Brazil ; Paraense (p. 488) reports investigations carried out.

A new malaria parasite of the toucan, *P. huffi*, is described by Muniz *et al.* (p. 604).

In spite of repeated attempts, Garnham (p. 674) failed to find the arthropod vectors of *Hepatocystis kochi*, but thinks that mosquitoes are not involved.

van Riel *et al.* (p. 374) describe a parasite of the bat *Roussettus leachi*.

Charles Wilcocks

MALARIA

Holstein, M. H. **Biologie d'*Anopheles gambiae*. Recherches en Afrique-Occidentale Française.** [Biology of *Anopheles gambiae*. Studies in French West Africa.]

This book is reviewed on p. 360.

Jaswant Singh & Badri Nath Mohan. **Studies on Nocturnal Activities of *A. fluviatilis* James, 1902.** *Indian J. Malariology*. 1951, Dec., v. 5, No. 4, 513–25.

This paper records some observations on the nocturnal movements of *A. fluviatilis* in a hyperendemic village in the foothills of the Nilgiris in South India. The observations covered all seasons of the year, and were carried out

in 4 huts, of which 3 were isolated from neighbouring huts, and one was in a group of huts. All mosquitoes available were collected every 3 hours from 6 p.m.

In addition to these records of time of entry and seasonal variation in abundance, experimental work was carried out, in which females at various stages in the gonotrophic cycles were marked with coloured dusts and released. A proportion of them were subsequently recaptured and their gonotrophic state was recorded. The numbers recaptured were high enough to be fairly reliable from this point of view, the lowest figure being 22 in one of the experiments. These recaptures were made in the hut in which the mosquitoes were released, and it is suggested that individual mosquitoes follow a closed circuit between fixed feeding, resting, and breeding places. It was found that a high proportion of female *A. fluviatilis* require a second blood meal for the completion of one gonotrophic cycle, taking this meal either in the same night as the first meal, or on the following night. This greatly increases the chances of malaria transmission. [The conclusion of these authors, with regard to the exit of unfed mosquitoes from houses before feeding, does not seem to be fully reliable, as the process of anaesthetizing and marking mosquitoes has been found to have an effect in inducing them to leave before feeding.]

A. J. P. Goodchild

HENDERSON, J. M. **Irrigation and Mosquitoes in the United States of America.** *Indian J. Malariology.* 1952, Mar., v. 6, No. 1, 73–116. [30 refs.]

The author, with special knowledge of the health aspects of irrigation, visited projects in India and has now elaborated a study of the subject in the United States. The dangers of irrigation in producing malaria and other mosquito-borne diseases, schistosomiasis, gastro-enteric infections, and grave discomfort which may mean serious detriment to animal husbandry are briefly reviewed. The need for irrigation, the history of its development and the principles on which it is carried out in the United States are set out in detail. Most of such irrigation is intermittent, not aiming at flooding of the field but at maintenance of the capillary water in the soil, though some crops such as rice are flooded. Acreage statements and rates of development are given.

Mosquito production may occur within the fields, and even where irrigation is intermittent a notable part of the land remains flooded long enough for emergence ; it may occur outside the crop areas in seepages, in pools created by high subsoil water levels, in drainage channels or in still water in the supply system, though these last areas are the less important. Much of the first type could be avoided by lining of channels or proper land preparation and drainage. Much nuisance is due to excessive or careless irrigation and may be avoided by proper engineering and agricultural practice. The paper concludes with notes on economic aspects of irrigation, relationship to farm ownership, water rights the cost of water, and ground water recharging.

[The paper will be valuable to those interested in irrigation and malaria, particularly in showing the probable lines of development of irrigation and the effects it may be expected to have on mosquito production.]

G. Macdonald

DE ZULUETA, J. **Observations on Mosquito Density in an Endemic Malarious Area in Eastern Colombia.** *Amer. J. Trop. Med. & Hyg.* 1952, Mar., v. 1, No. 2, 314–29, 2 figs. [15 refs.]

The area chosen for this study is situated about 44 miles south of Villavicencio, Colombia, and 25 miles from the foot of the eastern range of the Andes.

Traversed by the Ariari river, it maintains a mosquito population typical of both savanna country and of the transition area between savanna and mountain slopes ; of the latter region *Anopheles darlingi* is the chief malaria vector.

The observations were carried out over a stretch of savanna of about 3 square miles which contained the *ranchos* and small houses belonging to the some 600 inhabitants of the settlement. These dwelling places were mostly at the edge of the forest area of the Ariari river.

The results are given in a comparative way to illustrate the difference in species composition between mosquitoes obtained in house catches and those obtained in the savannas in stable traps and by other direct methods. Various animals, including donkey, calf and man, were used as bait and considerable host specificity is indicated ; *A. darlingi* clearly preferred man to calf or donkey under identical conditions ; conversely *A. argyritarsis* preferred donkey or calf to man in the same experiments.

To discover whether clearing an area surrounding a dwelling place might be a useful method in mosquito control, a circular area of about 30 yards radius was cleared round a stable trap. The mosquito catches from the trap show a marked diminution in numbers of all species except *darlingi*.

The author proposes to discuss the bionomics of *A. darlingi* in a separate publication but emphasizes here that in this region this species seems to be less associated with man and human dwellings than in other places, where its control by DDT house spraying has met with complete success. The results are shown in 7 tables. *Anne Hudson*

MUIRHEAD-THOMSON, R. C. & MERCIER, E. C. **Factors in Malaria Transmission by *Anopheles albimanus* in Jamaica. Part I.** *Ann. Trop. Med. & Parasit.* 1952, Sept., v. 46, No. 2, 103–16.

This work was done between January 1950 and April 1951, in the vicinity of Kingston, Jamaica. The observations include studies on the feeding and resting habits of *Anopheles albimanus* and investigations on the infectivity of several malaria cases to this vector. The authors' summary contains the principal results :—

" 1. Under experimental conditions gland infections in *Anopheles albimanus* can readily be produced from *Plasmodium falciparum* gametocyte-carriers. In the warm weather and during the rainy season gland infections can be produced as early as nine days after the infective feed, but in the cool weather no infections have been found before the 16th day.

" 2. The threshold of infection varies considerably from carrier to carrier, the youngest age-group—three years and under—being in general the best infectors.

" 3. A good subject could still produce a high proportion of gland infections in *A. albimanus* fed at a time when the gametocyte density was so low that only a single crescent could be found in 150 or even 200 fields of a thick film.

" 4. The lowest threshold recorded was 0·12 gametocytes per 1,000 leucocytes, or approximately two gametocytes per blood-meal. In this case it is likely that the density of gametocytes in the blood film may underestimate the actual number of gametocytes ingested by the mosquito.

" 5. In a random parasite survey the slides from such subjects might easily be dismissed as negative at a time when sufficient gametocytes were still present to infect mosquitoes. At the other extreme, one adult subject with an unusually high gametocyte density (up to 116 gametocytes per 1,000 leucocytes)

was completely non-infective to batches of *A. albimanus* fed on him at intervals over three weeks.

"6. The habits of *A. albimanus* as to the extent to which it feeds indoors and outdoors vary with the seasons of the year.

"7. In the dry season (December–July) nearly all biting on man takes place out of doors, *A. albimanus* at that time having very little contact with houses. Controlled experiments, with a donkey in a hut-trap and one tethered out of doors, show that over 95 per cent. of the biting takes place out of doors.

"8. In the rainy season (August–November) a high proportion of *A. albimanus* enter houses and feed indoors, and there is a considerable degree of contact with the inner walls of houses. Of those entering houses, a small residue (about 10 per cent.) may remain resting indoors during the day.

"9. *A. albimanus* has two sharp biting-peaks, one at sundown and one at dawn.

"10. *A. albimanus* appears to feed indiscriminately on man and the larger domestic animals, such as donkeys, mules, cows, etc.

"11. The outdoor resting-places of *A. albimanus* in Jamaica have not yet been found."

i. PITTENDRIGH, C. S. **The Ecoclimatic Divergence of** *Anopheles bellator* **and** *A. homunculus*. Reprinted from *Evolution*. 1950, Mar., v. 4, No. 1, 43–63, 10 figs. [18 refs.]

ii. ——. **The Ecotopic Specialization of** *Anopheles homunculus* **; and its relation to Competition with** *A. bellator*. *Ibid.* 64–78, 3 figs. [19 refs.]

In these two papers the author has studied the two important malaria vectors of Trinidad with reference to the ecological problem which they present. They are both of the subgenus *Kerteszia*, and breed in the water collections among the leaves of bromeliads. Over most of their range in the island of Trinidad, these two species occur together.

i. The first of the papers here abstracted examines in greater detail the distribution and its limiting factors, to ascertain whether in fact *Anopheles bellator* and *A. homunculus* share the same ecological niche, and to what extent they are in competition with one another. Standardized methods of catching were used, and vertical movement was investigated by means of platform catches. *Anopheles homunculus* was found to be more sensitive than *A. bellator* to low humidities, replacing the latter species completely in the wettest parts of Trinidad, and, conversely, being replaced by it in the driest part of the range of *A. bellator*. Similarly, in respect of vertical distribution and diurnal activity, and in the invasion of cacao farms (when malaria transmission takes place), higher humidities are required by *A. homunculus*. The bromeliads in which these mosquitoes breed need light in order to thrive, and are found in the upper parts of the forest canopy, where the humidity is lower. Breeding of both species ceases in drier regions although bromeliads may be present, because the mosquitoes are prevented, by low humidity, from reaching the breeding places.

ii. In the second paper, experiments are described which show a definite preference by *A. homunculus* for breeding in the smaller bromeliad species of the lower forest levels, thus proving that the two species of mosquito are not competing for breeding places. This is discussed from the evolutionary aspect. *A. J. P. Goodchild*

FUHRMANN, G. Betrachtungen zur Frage des Blutfarbstoffwechsels bei der Malaria. [**Observations on Blood Pigment in Malaria**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1952, Oct., v. 4, No. 1, 45–52, 3 figs. [11 refs.]

The author found that the rise in the level of loosely bound serum iron in malaria follows sporulation ; this is in agreement with the intracellular haemoglobin destruction postulated by FAIRLEY and BROMFIELD [this *Bulletin*, 1934, v. 31, 176 ; 1935, v. 32, 210, 828 ; 1937, v. 34, 841 ; 1939, v. 36, 885]. The author suggests that there are two malarial haematin compounds, one formed by the parasites inside the cells and the other methaemalbumin formed from liberated haemoglobin circulating in the plasma. It is suggested that inhibition of intracellular catalase by the malarial parasites plays a part in the disintegration of the haemoglobin molecule ; peroxide is known to " open " the system of porphyrin rings. *H. Lehmann*

HUNTER, R. C., Jr. & SHEEDY, J. A. **Liver Biopsy in Malaria.** *U.S. Armed Forces Med. J.* 1952, Nov., v. 3, No. 11, 1603–14, 4 figs. [Refs. in footnotes.]

Malarial patients are often found to be jaundiced. Rapid destruction of red blood cells cannot always be the cause, because patients can be seen with jaundice but no appreciable anaemia. The authors compared 20 men suffering from virus hepatitis and 8 with malaria who were very much alike in clinical symptoms. Most of them had recently returned from Korea. Examination of the liver by biopsy showed that 2 of the malaria patients who were not anaemic were in fact suffering from virus hepatitis as well. The other 6 who were anaemic showed a normal liver texture or changes consistent with haemolysis. The main differences between the two diseases are the demonstration of the parasite in malaria, a lower serum bilirubin, and absence of the histological changes of virus hepatitis in the liver. The importance of making the correct diagnosis is more than academic. One of the men in this series was treated for chronic hepatitis for 8 months ; chronic malaria may have been the only disease, in which event earlier treatment of this condition would have saved months of confinement to hospital and disability. *H. Lehmann*

GUREVITCH, J. & LAUFER, A. **A Mixed Infection with *Plasmodium vivax* and *P. ovale* revealed after Splenectomy.** *Ann. Trop. Med. & Parasit.* 1952, Nov., v. 46, No. 3, 238–9.

An Iraqui youth of 18, who had never previously left Iraq, arrived in Israel in May, 1951. He gave no history of relevant illness, but his father stated that all the family suffered from short bouts of fever and shivering twice a year.

At the end of August, the youth was involved in a motor accident and sustained severe abdominal injuries, which proved to include a ruptured spleen. The spleen was removed at operation and blood transfusions were given before and afterwards. The temperature rose to 41°C. but no malaria parasites were found. Two days later, there was a dramatic improvement, but the temperature remained raised, despite antibiotic treatment ; this was attributed to an abscess in the abdominal wall which was opened and drained. However 14 days later the temperature rose to 39·8°C. and after four days blood films showed a mixed infection with *Plasmodium vivax* and *P. ovale*. The patient responded at once to anti-malarial treatment. A month later, a liver biopsy showed malaria pigment in the Kupffer cells.

While the authors do not exclude the possibility of infection from blood transfusion, this was very remote in this case. It is more likely that there

was a recrudescence of an old malaria infection after trauma and splenectomy. It is added that Professor Adler called the authors' attention to another case of *P. ovale* from an immigrant from Tripoli : this also occurred after splenectomy, the fever and parasitaemia arising 10 days after operation. The authors' case is of special interest, as *P. ovale* had not previously been recorded from Iraq. *H. J. O'D. Burke-Gaffney*

Pille, G. Considérations pharmacologiques sur les antipaludiques de synthèse. [**Pharmacological Considerations on Synthetic Anti-Malarials**] *Méd. Trop.* Marseilles. 1952, Nov.–Dec., v. 12, No. 6, 707–20.

A general review and discussion.

Parker, F. S. & Irvin, J. L. **The Interaction of Chloroquine with the Albumin of Bovine Plasma.** *J. Biol. Chem.* 1952, Dec., v. 199, No. 2, 889–95, 3 figs.

Parker, F. S. & Irvin, J. L. **The Interaction of Chloroquine with Nucleic Acids and Nucleoproteins.** *J. Biol. Chem.* 1952, Dec., v. 199, No. 2, 897–909, 7 figs. [16 refs.]

Raynal, J. H. Actualités sur un nouvel anti-paludique de synthèse, la pyriméthamine (diamino-2-4 (chloro-4′ phényl)-5 éthyl-6 pyrimidine). [**Current Data Regarding a New Synthetic Anti-Malarial, Pyrimethamine (Daraprim)**] *Méd. Trop.* Marseilles. 1952, Nov.–Dec., v. 12, No. 6, 721–31. [23 refs.]

A general review and discussion, covering the recent literature.

Canet, J. & Farinaud, E. Premiers essais de prophylaxie collective du paludisme en Indochine par la diamino 2–4 (chloro 4′ phényl) 5-éthyl-6-pyrimidine (50–63 B. W. ou 4·7^{53} R.P.). [**First Trials of Mass Prophylaxis of Malaria in Indo-China by Daraprim**] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 5, 645–52.

The authors report the preliminary results of a large scale trial of 4753 R.P. (Daraprim ; Pyrimethamine) for the mass prophylaxis of malaria in a hyperendemic area of Cochin-China 120 km. north of Saigon.

The subjects treated fall into 4 groups. Those in Group 1 were Vietnam schoolchildren in the village of Honquan. It included 47 children aged 5 to 8 years, each of whom received 25 mgm. Daraprim weekly and 60 aged 6 to 13 years who received 50 mgm. weekly. One month after commencement of treatment the spleen rate of the two sub-groups combined had fallen from 32·7 to 16·5 per cent. and the parasite rate from 12·1 to 4·4 per cent. A comparison group of 50 children who had received no treatment, examined on the day of the second examination of the treated group, had a spleen rate of 61 per cent. and a parasite rate of 28 per cent.

Group 2 also resided in Honquan village and consisted of 143 adolescents belonging to a non-Vietnam tribe. Each received 50 mgm. Daraprim weekly. After 3 weeks the spleen rate had dropped from 36·4 to 26·4 per cent. and the parasite rate from 20·3 to 3·2 per cent.

Group 3 consisted of 300 adults and 100 children, all Vietnamese, residing in the plantation village of Anloc, 5 km. from Honquan. Adults received 100 mgm. Daraprim once weekly and children under 10 years of age 50 mgm.

The spleen and parasite rates of the adults fell from 10·6 and 5·9 to 3·0 and 1·9 after 1 month, and those of the children from 12·9 and 17·7 to 4·0 and 4·0 during the same period. After the fifth week the régime was altered from once weekly to once fortnightly dosage without any apparent effect on the malaria morbidity rate, but the authors point out that it is too early as yet to judge whether effective prophylaxis can be maintained under the latter régime.

Group 4 comprised 350 adults and 150 children, all Vietnamese, residing in the plantation village of Xaco, 12 km. from Honquan. The dosage of Daraprim was 50 mgm. weekly for adults and for children over 6 years of age and 25 mgm. for children under 6 years. The spleen rate in adults fell from 30 to 14 per cent. and in children from 21 to 12 per cent. after 2 months, and the parasite rate from 25 to 1·6 in adults and from 10 per cent. to 4·2 per cent. in children during the same period. In Anloc as well as in Xaco the malaria morbidity rate fell rapidly and after the third week became stabilized at around 0·5 per cent.

It is concluded that Daraprim is very effective for the mass prophylaxis of *P. falciparum* malaria in Cochin-China. It is well tolerated both by adults and children, the only inconvenience noted being a mild degree of insomnia in about 30 per cent. of the cases treated. It is considered that the drug is likely to prove of great value in the prophylaxis of this type of malaria, provided that administration over a prolonged period does not provoke the phenomenon of resistance on the part of the parasite. *G. Covell*

NORMAN, T. **An Investigation of the Failure of Proguanil Prophylaxis.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1952, Nov., v. 46, No. 6, 653–5.

The observations recorded were carried out in a group of tea estates in the Assam Valley, where proguanil has been administered to the entire labour force from May 1 to October 31 each year since 1948, the dose for an adult being 100 mgm. twice weekly.

Since 1950 there has been a general increase of malarial incidence in the Valley as a whole, including the group of estates under discussion.

In order to investigate the causes of malarial "break-throughs" two estate malaria surveyors were trained in the technique of testing urine for Proguanil devised by GAGE and ROSE [this *Bulletin*, 1947, v. 44, 500]. No less than 48 per cent. of 634 urines tested proved negative, or only weakly positive.

From an analysis of this and all other available evidence it is concluded that the "break-throughs" were due to a combination of lax administration and "consumer resistance". It is further concluded that chemoprophylaxis is unsuitable for long-term use on Assam tea estates as a preventive of malaria. However careful the administration it cannot be successful unless individuals are willing to swallow their pills.

[The practical difficulties of enforcing mass drug prophylaxis even among a community under disciplinary control are well illustrated by this paper. The application of this measure to a rural population where such control is non-existent is still less likely to achieve success.] *G. Covell*

PAMPANA, E. J. **The Eradication of Malaria.** Reprinted from *J. Amer. Med. Women's Ass.* 1952, July, v. 7, No. 7, 248–50.

The hopes placed half a century ago in wide control of malaria by drugs have been abandoned, as have those placed in larvicidal control. Imagocides have proved more promising and have achieved eradication of anophelines in

some places; the usual object, however, is eradication of malaria—not necessarily of anophelines. It requires careful preliminary epidemiological and entomological study and pilot schemes, and WHO has helped in these, hoping for their extension to nation-wide or even continental dimensions. Problems remaining to be solved include control of malaria carried by anophelines which normally rest out of doors, though residual insecticides certainly sometimes achieve this, and the policy to be adopted after apparent eradication has been achieved. Imagocidal work has been discontinued in British Guiana and Greece under carefully controlled conditions and no ill-effects have resulted. The danger of cessation is reduced as the area controlled increases. It seems probable that spraying could be discontinued if surveillance were adequate, particularly of migrant individuals and groups.

G. Macdonald

MACDONALD, G. **Malaria and its Control for Planters and Miners.** *Ross Inst. Industr. Advis. Committee Bull. No. 7.* 1952, Nov., 52 pp., 1 pl., 7 figs. & 1 diagram.

The last edition of this bulletin appeared in 1946 [this *Bulletin*, 1947, v. 44, 182], and the numerous advances made since then both in our knowledge of the life-cycle of the malaria parasite and in the development of control measures have necessitated the re-writing of practically the whole of the text. As its title implies the bulletin is intended primarily for those in charge of labour forces in malarious countries, its object being to render possible the institution of control measures where specialized advice on the subject is not available.

The various epidemiological types of malaria are explained in simple terms and an account is given of the malaria conditions and of the habits of the mosquito vectors in selected areas which are, or are likely to become, the scene of industrial enterprise in different Commonwealth countries.

Details are given of the technique of application of residual insecticides and there is a useful table illustrating basic measures for dilutions and suspensions of such insecticides and approximate costs per 1,000 sq. ft. of surface. Various apparatus for the application of insecticides are illustrated by text figures. There is a section on drug prophylaxis and one on measures of personal protection. There are also two appendices, one describing the life-cycle of the malaria parasite, the other that of the mosquito. Another very useful feature is the outline of a policy of malaria control for industrial undertakings.

This bulletin will be found useful not only by planters and miners, but also by health officers and others engaged in the planning and application of control measures wherever malaria is a serious problem. *G. Covell*

SRIVASTAVA, R. S. & CHAND, D. **Control of Malaria in Sarda Hydel Power-House Construction.** *Indian J. Malariology.* 1951, Dec., v. 5, No. 4, 579–94, 1 map.

Malaria in the Himalayan foothills or Terai is notoriously hyperendemic, and hydro-electric developments have made its control essential. The possible carriers include *Anopheles fluviatilis*, *A. minimus* and *A. culicifacies*, though they were not incriminated by discovery of sporozoites in the present case. Truly indigenous people show high spleen rates in children and low ones in adults, but more recent arrivals who intermix with people elsewhere show high rates in both adults and children. Construction work was made possible

by the use of DDT as an imagocide and larvicide ; the prophylactic use of paludrine [proguanil] ; the proper siting of camps, and jungle clearance. In 1946/47 it had been necessary to close work down for 5 months a year owing to the high incidence of malaria, but from 1948 to 1950 continuous work was possible ; sickness due to malaria was negligible, and spleen and parasite rates in the labour force were low.

Meteorological and malariometric data are given. *G. Macdonald*

Jaswant Singh, Ray, A. P., Basu, P. C. & Nair, C. P. **Acquired Resistance to Proguanil in** *Plasmodium knowlesi*. *Trans. Roy. Soc. Trop. Med. & Hyg.* 1952, Nov., v. 46, No. 6, 639–49, 3 charts. [41 refs.]

Plasmodium gallinaceum and *P. cynomolgi* have been shown to develop a considerable resistance to proguanil [paludrine] by appropriate treatment [this *Bulletin*, 1947, v. 44, 969, 970 ; 1949, v. 46, 219]. The present authors now report the development of acquired resistance of *P. knowlesi* in rhesus monkeys to the same drug. During serial passages a standard inoculum of plasmodia was given intravenously. The course of infection was followed in thick and thin stained smears and the number of parasites present in 10,000 erythrocytes was counted. The method of producing resistance was approximately that previously described for *P. knowlesi* [*ibid.*, 1942, v. 39, 438]. The starting dose of proguanil was 0·1 mgm. of base per kgm. body weight, and after 7 daily doses all parasites had disappeared from the blood to reappear again within a few days. On subinoculation the dose of drug in the fresh host was generally doubled ; and the donor animal was similarly treated. The strain of *P. knowlesi* was fully resistant after about a year's treatment during 7 serial passages. Parasites were then not completely cleared from the peripheral blood by a dosage of 48 mgm. of drug per kgm. The resistance persisted without treatment for a period of at least 8 months during several passages. The strain resistant to proguanil was found to be resistant also to daraprim and bromguanide but not to M.3349 (a precursor of proguanil), chloroquine or sulphadiazine. *J. D. Fulton*

Vargues, R. Étude de la résistance de *Plasmodium berghei* aux basses températures. [**Resistance of** *Plasmodium berghei* **to Low Temperatures**] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 4, 456–60, 1 fig.

The effect of low temperatures on *Plasmodium berghei* was studied by exposing tubes with citrated blood containing several million parasites to temperatures of 0°, −40° and −190°C. (liquid nitrogen) for periods from 1 minute to 24 hours and then thawing them by one of the following methods : rapidly (1 minute) at +40°C., or slowly (20 minutes) at +20°C. and (1½–2 hours) in cotton wool chilled in liquid nitrogen.

The effect of freezing upon the vitality of the parasites was assessed quantitatively, by inoculating rats with known numbers of parasites and then estimating the proportion which were viable, on the basis of the incubation period, the length of which, according to previous observations [this *Bulletin*, 1952, v. 49, 484], is inversely proportional to the number of living parasites inoculated.

The results of these experiments are shown in the accompanying table [slightly modified from the original], from which it is seen that *P. berghei* survives freezing to temperatures as low as −190°C., the proportion of survivors varying considerably, according to the conditions of freezing and thawing.

Experiment		Rats Inoculated	Number of Parasites in Inoculum (millions)	Incubation Period (in days)	Proportion of Survived Parasites
Effect of temperature (slow thawing)	0°	S 42	400	2	0·1
	−40°	S 43	400	2	0·1
	−190°	S 44	400	5	0·001
	−190°	S 46	800	5	0·001
	−190°	238	300	6	0·0001
	−190°	239	300	6	0·0001
	−190°	242	300	5	0·001
Effect of length of freezing (slow thawing)	1 m.	S 57	100	5	0·001
	10 ,,	S 45	400	4	0·01
	15 ,,	S 59	100	5	0·001
	1 hr.	S 61	100	6	0·0001
	3 ,,	S 63	100	7	0·00001
	18 ,,	S 65	100	7	0·00001
	24 ,,	S 68	100	7	0·00001
Effect of length of freezing (rapid thawing)	1 m.	S 104	5	3	0·1
	30 ,,	S 109	100	3	0·001
	4 hr.	S 105	5	4	0·01
	6 ,,	S 110	100	3	0·001
	19 ,,	S 106	5	4	0·001
	22 ,,	S 111	100	4	0·0001
	27 ,,	S 100	5	5	0·0001
Effect of thawing method	rapid (1 m.)	S 78	5	5	0·01
		S 90	10	3	0·1
		S 100	7·5	3	0·1
	slow (30 m.)	S 79	5	3	0
		S 91	10	5	0·01
		S 80	5	5	0
	very slow (90 m.)	S 101	7·5	–	0
		S 102	7·5	–	0

C. A. Hoare

KRUSZYŃSKI, J. **A Microchemical Study of *Plasmodium berghei* by Micro-incineration, with a Note on the Microscopical Demonstration of Calcium.** *Ann. Trop. Med. & Parasit.* 1952, Sept., v. 46, No. 2, 117–20, 6 figs. on pl. [19 refs.]

In a previous paper [this *Bulletin*, 1952, v. 49, 603] the author has analysed the mineral components of *Plasmodium gallinaceum* by micro-incineration, and has suggested that K, P and especially Ca found in the parasite might be derived from the blood plasma. But since these elements are also present in the erythrocytes, especially in the nucleus, this problem has been re-investigated in a malaria parasite of non-nucleated red cells, *viz.*, *P. berghei* in mice. With the use of animals in which from 15 to 23·66 per cent. of the erythrocytes were infected, and the previous technique for micro-incineration and microchemical analysis, blood films on coverslips were examined with the phase-contrast microscope, and in incident light provided by the Leitz Ultropak. Microchemical tests for calcium were made with the aid of a micromanipulator and a

glass micropipette charged with 4 per cent. H_2SO_4 in 5 per cent. alcohol, by means of which the reagent was applied to selected infected cells, in which the formation of crystals of $CaSO_4$ could be observed and localized.

It was found that infected red cells had a larger amount of ash than non-infected ones. Crystals of $CaSO_4$ were formed in large numbers on the surface of the infected cells, the amount of Ca salts increasing with the age of the parasite, whereas normal erythrocytes appeared to be free of Ca. Hence it is concluded that this element is contributed by ash from the parasite, which obtains it directly from the surrounding blood and not from the host-cell.

The paper is illustrated by 6 phase-contrast photomicrographs.

C. A. Hoare

Fabiani, G., Vargues, R., Grellet, P., Fulchiron, G. & Verain, Alice. Le paludisme expérimental du rat blanc à *Plasmodium berghei*. [**Experimental Malaria of the White Rat due to** *Plasmodium berghei*] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 4, 524–39.

This is a comprehensive account of malaria produced in white rats by *Plasmodium berghei*. It is based on experimental investigations carried out with 450 animals, some parts of which have been previously published and reviewed [this *Bulletin*, 1952, v. 49, 484, 485, 602, 669, 670]. For ordinary passages, the rats were inoculated with a drop of infected blood, but known quantities of parasitized red cells were used for the determination of the incubation period, for the study of immunity, and for chemotherapeutic purposes. An inoculum of 100,000 parasitized cells produces infection with an incubation period of 4–5 days, but massive doses (300–500 million parasitized red cells) may produce parasitaemia immediately, when injected intracardially, or, after a short interval, by the intraperitoneal route.

In primary infections the disease runs an acute course lasting from 4 to 18 days. During the patent period parasitaemia increases progressively until up to 1,200,000 (70 per cent.) erythrocytes per cmm. are parasitized (=5,500,000 parasites). This period is characterized by anaemia, due to destruction of the parasitized cells, the number of erythrocytes being reduced to 3, 2 or 1 million per cmm. At the same time there are signs of regeneration, expressed by an increase in the number of polychromatophile cells. The chief change among the leucocytes is a slight monocytosis.

After parasitaemia has lasted 8–10 days the disease may rapidly terminate in the death or recovery of the host. The mortality rate in 239 rats was 42 per cent., the animals dying at the height of parasitaemia. In those which survived, the parasitaemia fell rapidly in the course of 48 hours or longer periods, until the parasites disappeared and the host recovered.

Rat malaria may assume renal, icteric, bilious haemoglobinuric and nervous forms. In gravid rats the disease may cause interruption of pregnancy. Among 35 new-born rats 4 had congenital infections. In animals kept on a vitamin A-deficient diet the infection runs a benign course of short duration.

The authors note the following changes in the blood of infected rats : increase of euglobulins, gradual diminution of complement, the appearance of specific complement-fixing antibodies, and the presence of a humoral factor responsible for a progressive diminution of the number of merozoites produced at each segmentation of schizonts.

The pathological changes take the form of multiple lesions in the liver, spleen, brain and lungs, which contain pigment and show signs of congestion, and reticulo-endothelial reaction, while the liver undergoes fatty degeneration.

In rats which have recovered from the acute phase, the infection becomes latent. The parasites disappear almost entirely from the circulation (one

parasitized erythrocyte per 5 or 10 thousand), but persist in the inner organs. There are no spontaneous relapses, but these can be provoked by splenectomy or suprarenalectomy or both. During the latent period the rats are refractory to reinfections, the type of resistance conforming to premunition.

In conclusion, the behaviour of *P. berghei* in the rat is compared with that in other animals, and with other malaria parasites. *C. A. Hoare*

BLACK, R. H. **The Absorption of Inoculated Blood containing *Plasmodium berghei* from the Peritoneal Cavity of the Mouse.** *Ann. Trop. Med. & Parasit.* 1952, Sept., v. 46, No. 2, 144–9, 1 fig.

The author describes the results of experiments designed to study the fate of *Plasmodium berghei* after intraperitoneal [i.p.] inoculation into mice of 50×10^6 parasitized erythrocytes. In one experiment, 20 cmm. of blood were taken from the tail-vessel of a mouse at eight intervals from 1 to 120 minutes after its peritoneal inoculation, and these samples were injected into 8 mice, whose blood was later examined for infection. Since all the mice became infected, it was evident that the parasites found their way into the blood one minute after infection by the intraperitoneal route. In another experiment, 8 infected mice were killed at intervals from 1 to 18 hours, and their peritoneal cavities were carefully examined with filter paper for the presence of inoculated blood. It was found that the amount of blood began to diminish after 6–8 hours, leaving only a slight pinkish stain on filter paper after 18 hours. It is concluded that most of the infected red cells inoculated into the peritoneal cavity are absorbed within 24 hours.

The author then records the observed parasite densities on the 1st, 2nd and 3rd days after i.p. inoculation and compares them with calculated densities. He concludes that in 24 hours i.p. inoculation produces in the peripheral blood of the mouse a parasite density which is comparable to that reached in a few minutes after intravenous injection of the same inoculum. *C. A. Hoare*

DUBIN, I. N. **The Cultivation of the Exoerythrocytic Forms of *Plasmodium gallinaceum* in Tissue Culture.** *J. Infect. Dis.* 1952, July–Aug., v. 91, No. 1, 33–49. [25 refs.]

Exo-erythrocytic forms of *Plasmodium gallinaceum* were cultivated in various tissues prepared from infected chick embryos, with the view to assessing their suitability as media for cultures and to study the effects of environmental factors on the parasites and host cells. The EE forms grew readily in culture of spleen, brain, liver, lung, bone-marrow, skeletal and heart muscle, the best results being obtained with the first three. All stages of development occurred in macrophages, endothelial cells and fibroblasts. Macrophage cultures (originating from spleen implants) on coverslips without plasma clot were most suitable for the study of the effects of various environmental factors on the host-cell-parasite system, which were as follows. The addition of heparin to the plasma (1 : 7,000) had no appreciable effect, even in the presence of 1 : 4,000 phenol, added as a preservative ; the addition of heterologous (human) serum to chick tissue suppressed macrophage growth ; the EE forms showed a narrow range of *p*H tolerance, which was between 7·2 and 8·0, while the optimum *p*H for macrophage growth was from 6·8 to 8·2 ; the optimum osmotic pressure for both parasites and host-cells was between 7 and 11 atmospheres ; the most favourable concentration of serum for the growth of parasites and macrophages was 20 per cent. ; the formation of " lipoprotein " precipitate in the chick serum had no effect upon the cultures ; 1 per cent. chick embryo

juice had no effect on the growth of the parasites, 10 per cent. slightly reduced their numbers, while 20 per cent. produced a marked reduction ; glucose in concentrations from 50 to 1,100 mgm. per cent. had no deleterious effect on the cultures ; the cultures grew well in concentrations of calcium from 11 to 1,070 mgm. per litre, and of phosphorus from 7 to 650 mgm. per litre, while a decrease in the bicarbonate content of the medium to 1/10 inhibited the growth of the parasites.

Attempts to cultivate infected tissues in synthetic media were unsuccessful. When salivary glands of *Aëdes aegypti* infected with *P. gallinaceum* were inoculated in cultures of normal chick macrophages, the sporozoites underwent in them a complete pre-erythrocytic development for 4 generations (7 days). These cultures were successfully inoculated into chicks, in which the parasites went through a normal erythrocytic cycle, with formation of gametocytes, from which the infection could be passed on to mosquitoes, in which the parasites continued their development up to the formation of sporozoites, which in their turn were infective to chicks and could be grown in macrophage cultures.

C. A. Hoare

GARNHAM, P. C. C. & PICK, F. **Unusual Form of Merocysts of** *Hepatocystis* (=*Plasmodium*) *kochi*. *Trans. Roy. Soc. Trop. Med. & Hyg.* 1952, Sept., v. 46, No. 5, 535–7, 6 figs. on 2 pls.

Normally the final stage of schizogony of *Hepatocystis kochi* in the liver of monkeys appears in the form of a merocyst, " consisting of a rim of packed merozoites surrounding a cavity ". In the present paper the authors describe the occurrence of merocysts of a different type in two baboons which had been kept in captivity for a year. In liver sections fixed in Bouin's fluid, the merocysts were detached from the liver parenchyma ; instead of a clear-cut rim there was a convoluted structure studded with nuclei, and the cyst contained a colloid fluid. The nuclei of the parasite were larger than normal, the surrounding liver cells were compressed, and numerous phagocytes, including eosinophiles, were present. Moreover, the merocysts contained numerous crystals of a protein nature. An immature schizont was seen in association with a highly hypertrophied host cell nucleus. It is thought that the multilocular appearance of the merocysts was due to infolding and branching of the plasmodial rim, and that their unusual structure might have been due to the unnatural conditions under which the monkeys were living, but does not indicate the presence of a special stage or variant of *H. kochi*.

The merocysts described in this paper are clearly illustrated in a number of photomicrographs. *C. A. Hoare*

BLACKWATER FEVER

GUNTHER, C. E. M. & BRUCE, H. B. **Dextran in Blackwater Fever.** *Med. J. Australia.* 1952, Nov. 22, v. 2, No. 21, 745–6.

A white man of 52, who had had numerous attacks of malaria during his 20 years in New Guinea, developed a severe attack of blackwater fever in April 1952 and was admitted to a hospital in Papua. The patient's urine was very dark red, and contained much oxyhaemoglobin but no methaemoglobin or methaemalbumin, nor did it contain red cells or amorphous deposits (this is believed to be the first case of this type of blackwater fever reported in New Guinea). The patient's blood autohaemolysed on slides, but as far as could be determined no malaria parasites were present.

The patient's condition deteriorated rapidly and on the 3rd day, haemoglobin was below 20 per cent. ; fluids could not be retained and there was watery diarrhoea. There was no response to intravenous glucose-saline. So ill was the patient that it seemed unlikely that he would survive until blood transfusion could be given. In the afternoon he was given 500 ml. of 6 per cent. dextran solution intravenously. The effect was dramatic—all-round improvement took place and within an hour a totally different picture was present. The dextran was followed by 500 ml. of plasma and the dextran itself was repeated that night. Next morning, the patient was taking plenty of fluids, and his urine was copious and pale : autohaemolysis had disappeared. Because of some ascites and crepitations in his lungs, transfusion was postponed until next day, and after it, the patient improved rapidly. On the 9th day, haemoglobin was 51 per cent. and red cells 2·9 million per cmm. and Nivaquine was given. Eleven days later, the patient was discharged and has remained well.

The authors consider that dextran was as good as plasma in maintaining life pending transfusion, and safer than whole blood when haemolysis was present. It can also be stored and used in circumstances in which plasma is unavailable.

Although the manufacturers warn that blood typing should be done before dextran is given, it was not possible in this case, yet cross-matching was carried out without difficulty after 1,000 ml. of 6 per cent. dextran had been given.

H. J. O'D. Burke-Gaffney

TRYPANOSOMIASIS

LOTTE, A. J. **Historical Record of the Trypanosomiasis Focus of Nola.** *Bureau Permanent Interafricain de la Tsé-Tsé et de la Trypanosomiase. No. 194/T.* Léopoldville (Congo Belge). 1952, Oct. 29, 14 mimeographed pp., 1 map. [Bibliography.]

This is an account of the course of sleeping sickness in the Nola District of French Equatorial Africa and of the vicissitudes and difficulties met with in attempts to control it since 1935. Little impression was made until the foundation of the " General Service of Mobile Hygiene and Prophylaxis " in 1946 but at the end of 1951, with a reduction of the " index of circulating virus " [parasite index] to 0·03, the Nola focus was regarded as under control. *J. F. Corson*

BELL, F. **A Description of an Outbreak of Human Trypanosomiasis with special reference to the Prognostic Value of the Cerebrospinal Fluid.** *East African Med. J.* 1952, Nov., v. 29, No. 11, 453–75, 1 map. [57 refs.]

The outbreak occurred in the Ukerewe peninsula, in Tanganyika Territory, on the eastern shore of Lake Victoria ; it was discovered in 1939 and ended in 1943 and there were 318 known cases and 167 deaths. It was caused by *Trypanosoma rhodesiense* and transmitted by *Glossina swynnertoni*. The author briefly describes the control measures taken and the mode of treatment with suramin and tryparsamide, but, as stated in the title, the state of the cerebrospinal fluid in regard to prognosis is the main subject of interest. The cerebrospinal fluid [c.s.f.] was regarded as normal if it contained not more than 20 cells per cmm. and 38 mgm. of total protein per 100 ml. as shown by precipitation with trichloracetic acid in a Sicard and Cantaloupe tube. The results are shown in tables of recoveries and deaths of patients with originally normal and abnormal c.s.f. respectively.

Of 123 patients with normal c.s.f. 79 recovered and 44 died, but the cause of death was often unknown and only 9 were known to be due to sleeping sickness ; of 78 with abnormal c.s.f. 9 recovered and 69 died and 67 of these died of sleeping sickness. Early cases (illness under 1 month) had a recovery rate of 65 out of 100, late cases 19 per cent. (16 out of 83). Three of the 9 patients with abnormal c.s.f. who recovered were remarkable ; the protein content was high (56, 53, 80) but they were well (one seen by the author, two reported) eight or nine years later. *J. F. Corson*

Rupp, H. Contribution à la lutte contre les Tsétsés. Influence " d'étoffes attractives ", imprégnées de DDT, sur *Glossina palpalis*, ssp. *martinii* Zpt. [**A Contribution to Tsetse Control : the Use of Fabrics impregnated with DDT against** *G. palpalis*] *Acta Tropica*. Basle. 1952, v. 9, No. 4, 289–303, 7 figs. [16 refs.]

The author has studied *Glossina palpalis* var. *martinii* along the banks of rivers in Ruanda Urundi.

He finds that the insects settle on black or blue cloth rather than certain other colours, particularly if the cloths are fluttering in the wind. He therefore impregnates cloth with DDT and hangs it over a stream. In a single experiment after some 10 weeks, the tsetse population fell to a third of the population on another stream. [The dose of DDT seems to have been about 3·3 gm. on cloth 140×50 cm. It was applied from an emulsion, and must surely have washed out with rain.] *P. A. Buxton*

Burtt, E. **The Occurrence in Nature of Tsetse Pupae** (*Glossina swynnertoni* **Austen**). *Acta Tropica*. Basle. 1952, v. 9, No. 4, 304–44, 19 figs. [11 refs.]

The author is interested in the breeding habits of *G. swynnertoni* in the country near Shinyanga in the north of Tanganyika. Previous workers had found that pupae could be obtained in large numbers in the dry season : in the wet season extremely few can be found unless a failure of rains occurs in which case they are less difficult to discover : in any case the number that can be collected seems very small in view of the abundance of the tsetse. Newly emerged flies are found during the wet season so that one cannot suppose that any cessation of breeding occurs.

The author gives a description of the environment, including the seasons and soil, which when it is wet is sticky and clings to small objects which would render it very difficult to discover pupae. As to the vegetation, there are several types of large tree which often contain cavities at the base or rot holes. There are also characteristic thickets made of small trees, mostly deciduous with evergreen climbers. The features of vegetation are admirably illustrated by photographs.

One local African had a particular gift for discovering pupae and he and others were used in a detailed study of the breeding places of the insect at different seasons. Their apparent rarity in the rains was confirmed : for instance, in the wet months of January to April of one year only 4 pupae were discovered. After several years of investigation it became apparent that the female fly when about to deposit larvae often perches on the underside of a log or branch which is raised a little above the soil. This has proved to be the key of further work in 1952, the importance of these particular perches becoming more clear : it was found that females resort to them after long periods of time. This is excellently illustrated by photographs showing logs which arch up above the ground, the sites at which pupae have been found being marked by numerous pegs. It was also found that during the wet season pupae might be found on the surface of bare soil protected by heavy overhead cover. This was confirmed by placing parturient females on trays of soil in an outside cage : when the larvae

were produced they frequently turned into pupae on the surface of the soil, and were extremely difficult to see, even in a pan, owing to particles of mud adhering to them.

In the dry season there was a tendency for the pupae to be more frequently buried, doubtless because the larvae could penetrate the dry, looser soil. There was also a movement of breeding places, pupae often occurring in thickets beside rivers during the hot, dry season but not in the early part of the dry season.

The paper is particularly interesting because the author has found it possible to combine observation in the field with experiments in or near the laboratory.

P. A. Buxton

CECCALDI, J. Du traitement des nouveaux trypanosomés par le 3.854 RP ou Arsobal. [**Treatment of New Cases of Trypanosomiasis with 3854 RP or Arsobal**] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 5, 652–80.

In a previous clinical trial [see this *Bulletin*, 1950, v. 47, 824] the author and others found that 3854 RP (Arsobal) of the Société Spécia was less toxic than Mel B, another preparation of the same drug ; they found also that it was effective in some cases of sleeping sickness where the usual trypanocides had failed. He therefore made a further trial in 1949 and 1950 at Brazzaville on 73 new cases of sleeping sickness and used 4 methods of dosage. The stages of the disease are classified as the lymphatic gland and blood stage (L.S.), the stage of meningeal reaction (M.R.) and the stage of meningo-encephalitis (M.E.).

Fifteen patients (11 L.S., 4 M.R.) received a single injection of 4 mgm./kgm., the dose not to exceed 220 mgm. ; four (1 M.R., 3 M.E.) got a daily injection of 3 mgm./kgm. for 4 days ; seventeen (1 M.R., 16 M.E.) had first a daily injection of 1·5 mgm./kgm. for 4 days, then 15 days later, a second course of 3 mgm./kgm. per day for 4 days ; the remaining thirty-seven (7 L.S., 2 M.R., 28 M.E.) received a daily injection of 3·6 mgm./kgm. for 4 days, a dose not to exceed 180 mgm., and this course was repeated 15 days later.

The author describes the progress of the cases in detail with the results of microscopical and biochemical examinations which are also shown in tables. The cases were followed up for various periods up to 30 months. Toxic effects were observed ; encephalopathy occurred in 5 patients and was fatal in 2, while in several cases considerable albuminuria was produced. The author concludes that the drug is a powerful trypanocide which acts very quickly on trypanosomes in the blood and glands and also on those in the cerebrospinal fluid [c.s.f.]. Ten out of 11 patients with normal c.s.f. were apparently cured by a single injection. In the two groups of advanced cases treated by two courses of injections totalling 18 mgm./kgm. and 28 mgm./kgm. respectively, the results (50–60 per cent. successful) were about equal. To try to minimize the toxic effects of the drug the author has begun a clinical trial with two courses of three daily injections of 3·6 mgm./kgm. as suggested by Friedheim. The c.s.f. does not usually become normal for about 7 months after a course of treatment so treatment should not be repeated in the meantime. Arsobal should not yet be used for mass treatment but should be reserved for use in centres where the patients can be kept under observation.

J. F. Corson

LE GAC, P. & ZIEGLER, P. La trypanosomiase en Oubangui-Chari. Le foyer de l'Ouham. Sa prophylaxie par la Lomidine. [**Trypanosomiasis in the Ouham Focus of Oubangui-Chari (French Equatorial Africa) and its Control by Chemoprophylaxis with Lomidine**] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 2, 235–42, 2 maps.

An earlier contribution [Le Gac, this *Bulletin*, 1952, v. 49, 245] described the history of trypanosomiasis control in the Nola focus of Oubangui-Chari,

notorious as the oldest and most serious focus of the disease in the whole of French Equatorial Africa. Little progress had been achieved before the introduction of mass chemoprophylaxis by pentamidine. This produced spectacular results in less than two years, and similar success has since been achieved in the Ouham focus, described as the second bastion of trypanosomiasis in Oubangui-Chari.

The Ouham region is a plateau of 50,000 square kilometres of savanna and woodland, with a riverine system similar to that of the basin of the Chari (*i.e.*, of the Tchad). It is essentially agricultural, with a population of about 125,000. Sleeping sickness work began there in 1929 but it was not until 1933/34 that an extensive survey was done, when an overall infection rate of about 14 per cent. was discovered. Systematic treatment campaigns since that date were seriously curtailed by the war.

Surveys conducted from 1945 to 1950 inclusive showed figures fluctuating between 0·18 and 0·63 for the " Index of New Infection " and 0·21 and 0·65 for the " Parasite Index ". These figures appeared to represent the irreducible minimum level of endemicity which the older methods of control seemed incapable of reducing any further. Control measures directed against tsetse-fly could not be put into action sufficiently because of labour supply difficulties and lack of funds. Reliance therefore came to be placed mainly on mass chemoprophylaxis, concentrated on the more heavily infected centres.

Lomidine was given intramuscularly in a dose of 4 mgm. per kgm. body weight, repeated every 6 months over a period of 18 months. The only untoward side effects in 57,978 injections were 12 instances of fainting and 100 of vomiting. In all, 20,382 people were given a first injection in early 1950, at which time 175 new and 10 old cases had been recognized in the areas concerned. By the time of the second treatment, 6 months later, only 3 new cases and no chronic infections were discovered in 17,703 persons examined. At the time of the third injection no cases were found in 18,704 people examined.

Expressed in other terms the Index of New Infection in the villages studied was 0·89 per cent., and the Parasite Index 0·91 per cent., at the start of the campaign, and both indices were reduced to 0·07 six months later, *i.e.*, a reduction to about one-thirteenth of the original figure. The most spectacular improvement was in the district of Batangafo, where indices of 1·06 and 1·11 per cent. in a population of 8,104 were reduced a hundred-fold by the end of the campaign.

The authors conclude that chemoprophylaxis by lomidine (or by pentamidine) constitutes the method of choice for rapidly clearing the most seriously affected endemic foci of the infection. *E. M. Lourie*

INOKI, S. **A New Experimental Method and Genetical Interpretation on the Antigenic Variation in** *Trypanosoma gambiense*. *Med. J. Osaka Univ.* 1952, Mar., v. 3, No. 1, 81–6, 3 figs. [18 refs.]

Observations were made on antigenic variation of *Trypanosoma gambiense* in infected mice. It was found that the infection, which is usually fatal to these animals, can be cured by subcutaneous injection of 0·4 cc. of inactivated human serum, while the injection of only 0·1–0·2 cc. was followed by a relapse within one or two weeks. By similar treatment, a succession of 7 relapses can be produced in the same mouse, each relapse strain differing serologically from the original one and from each other, and " breeding true " when subinoculated into new mice. However, when relapses were produced in the latter they reverted to the original type, irrespective of the type of variant which initiated the infection.

This phenomenon could be reproduced *in vitro* as follows. If the blood of a mouse infected with a relapse strain is mixed on a slide with the corresponding

antiserum, the trypanosomes form agglomerations [agglutination], but later break away and become free. If the free trypanosomes are then tested with the antiserum for the original strain, they may become agglutinated 20 minutes after the initial exposure to the homologous antiserum, thus indicating that during this period they had reverted to the original type. Moreover, since the new antigenic character persisted in the strain after successive passages through mice, it was evidently hereditarily fixed.

In discussing the nature of this phenomenon, the author concludes that the antigenic variation depends not only on mutation and selection, but also involves adaptive modifications on the part of the trypanosomes. However, the exact mechanism of the transformation remains unknown. *C. A. Hoare*

LAUNOY, L. Étude de l'action thérapeutique curative du diamidinodiphénoxypentane sur l'infection expérimentale à *Tr. gambiense* du rat. II. Comportement d'animaux antérieurement guéris d'une trypanosomose, à l'inoculation, retardée, du trypanosome homologue. [**The Therapeutic Action of Lomidine against** *T. gambiense* **Infections in the Rat. II. The Susceptibility of Cured Rats to Re-Infection by the Homologous Strain**] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 3, 321–6.

The normal course of infection with Yaoundé strain of *T. gambiense* in rats, and its response to pentamidine, was described in the first paper of this series [Launoy, this *Bulletin*, 1952, v. 49, 491]. Using the same strain and the same drug, the author has since studied the question of immunity to re-infection 9 to 15 months after a curative dose.

In 13 rats there was no indication of any acquired immunity, the test inoculation giving rise to infections which ran a course indistinguishable from those of primary infections. In 3 rats there was a significantly longer incubation period and a lighter blood infection, of slightly longer duration than usual, but ending fatally nevertheless.

Five other rats were used to test the efficacy of pentamidine against infections resulting from the re-inoculation of rats previously cured by an earlier dose of the same drug. These secondary infections seemed to respond to the drug in the same way as primary infections might have done.

[It might be worth considering the possibility that the apparent absence of acquired immunity might be attributable not to a failure of the host to develop an immune state but to the fact that the trypanosome's labile antigenic constitution enables it to circumvent the host's immunity, as has been shown for other trypanosome species in mice—see CALVER, *ibid.*, 1945, v. 42, 704 ; FULTON and LOURIE, *ibid.*, 1947, v. 44, 403.] *E. M. Lourie*

DEOM, J. **Therapy of the Trypanosomiasis in Bovines by a New Derivate of Phenanthridinium, the 150C47 B & W.** *Bureau Permanent Interafricain de la Tsé-Tsé et de la Trypanosomiase. No. 190/T.* Léopoldville (Congo Belge). 1952, June 23, 6 mimeographed pp.

ANDRIANNE, V. F. Contribution à l'étude de l'action curative et prophylactique de l'antrycide dans les trypanosomiases à *Trypanosoma congolense* et à *Trypanosoma vivax* des bovidés. [**Therapeutic and Prophylactic Trials of Antrycide against** *T. congolense* **and** *T. vivax* **Infections in Cattle**] *Ann. Soc. Belge de Méd. Trop.* 1952, Feb. 29, v. 32, No. 1, 1–10. [17 refs.]

Therapeutic and prophylactic trials of antrycide were carried out against infections of *T. congolense* and *T. vivax* in cattle. The antrycide was used in the

form of (*a*) the dimethylsulphate, which has essentially therapeutic rather than prophylactic properties, and (*b*) the "prosalt", which is a mixture of 3 parts dimethylsulphate and 4 parts dichloride and is reputed to combine the virtues of therapeutic with those of prophylactic activity.

Therapy

T. congolense.—Naturally or experimentally infected indigenous or cross-bred stock were used. Eight animals were treated in doses of 2 to 4 mgm. per kgm. subcutaneously, one in a dose of 2 mgm. per kgm. intramuscularly, and two in a dose of 1 mgm. per kgm. intravenously.

One of the animals treated by 4 mgm. subcutaneously died 17 days later of *Theileria* infection ; one treated by 1 mgm. intravenously relapsed 30 days later (it had previously relapsed after a dose of dimidium) ; and all the remainder were judged to be cured in an observation period of 7 to 9 months.

The blood of two animals was examined at frequent intervals for some hours after treatment by 4 mgm. subcutaneously. Trypanosomes were at least twice as numerous 15 to 90 minutes later, and were in fact increased about three-fold and ten-fold respectively at the moment of maximum density, about 30 minutes after the dose. They then disappeared 3 and 7 hours later.

T. vivax.—Ten bovines were treated by 2·5 to 5·0 mgm. per kgm. subcutaneously and one by 1·5 mgm. per kgm. intravenously. Two of the animals treated by 5·0 mgm., which were in particularly poor condition, died a few days later. The others remained free of trypanosomes over the observation period of 5 to 8 months.

The blood of one animal was examined at frequent intervals after a dose of 5 mgm., and the number of trypanosomes was observed to fluctuate between about one-half and twice the original count during the first few hours. They were still present after 12 hours, but in all except two animals examined 24 hours after treatment they had disappeared by that time.

Toxicity of the dimethylsulphate.—An adult bovine died immediately after a slow intravenous injection of 4 mgm. per kgm. There were no abnormal post-mortem findings. One of 3 animals given a subcutaneous injection of about 13 mgm. subcutaneously died with haemorrhagic enteritis 18 days later, a similar condition having been observed also in an animal that died 16 days after the beginning of a course of daily injections of unspecified dosage.

Abortions seemed to be caused, on occasion, by the subcutaneous injection of 3 mgm. or more per kgm.

Prophylaxis

The "prosalt" was given subcutaneously in doses of 5 and 10 mgm. per kgm. to 40 bovines which were then repeatedly inoculated with trypanosomes at intervals of 3 to 4 weeks. Interim results were as follows :

T. congolense.—Ten animals received 5 mgm. per kgm. In 6 of them trypanosomes were seen in the blood 105 to 125 days after the start of treatment (the last test inocula having been given on the 66th and the 86th days). In one animal trypanosomes were seen 134 days after treatment (last test inocula on the 86th and 122nd days). The remaining three animals were still negative on the 150th day (last test inocula on the 122nd and 137th days).

Eleven animals received 10 mgm. per kgm. In one of them trypanosomes were seen 88 days after the start of treatment (last test inoculum on the 66th day). Nine others were still negative on the 150th day (last test inocula on the 122nd and 137th days). The remaining animal, which had not been repeatedly inoculated with trypanosomes but had merely been exposed to natural infection, showed trypanosomes on the 112th day.

The author concludes therefore that protection against *T. congolense* infection is usually afforded under these conditions for about 100 days by 5 mgm. and for at least 150 days by 10 mgm. per kgm.

T. vivax.—Nine animals received 5 mgm. and ten received 10 mgm. per kgm. One died of worm infestation 65 days after the start of treatment. Sixteen were still free of infection after 135 days (last test inoculum on the 107th day). The remaining two, which had not been repeatedly inoculated with trypanosomes, developed natural *T. vivax* infections 136 and 147 days after treatment by 5 and 10 mgm. respectively.

No abortions were associated with administration of the "prosalt".

E. M. Lourie

UNSWORTH, K. & CHANDLER, R. L. **Field Trials with Prophylactic Antrycide in West Africa.** *Ann. Trop. Med. & Parasit.* 1952, Nov., v. 46, No. 3, 240–49.

ORMEROD, W. E. **A Study of Resistance to Antrycide in a Strain of *Trypanosoma equiperdum*.** *Brit. J. Pharmacol. & Chemotherapy.* 1952, Dec., v. 7, No. 4, 674–84, 2 pls. [11 refs.]

It has been suggested previously by the author [this *Bulletin*, 1951, v. 48, 961, 962] that the growth of trypanosomes is inhibited by antrycide and other drugs as a result of splitting of cytoplasmic nucleoprotein into the components ribonucleic acid and protein. In the present study the mode of preparing resistant strains and the manner in which they and normal strains react to drugs is considered. To produce resistance splenectomized mice with heavy infections of *T. equiperdum* were given 0·2 ml. of "Collosol cuprum" intravenously followed by antrycide chloride subcutaneously in a saline suspension, thus ensuring a slow rate of absorption of drug. Frequent passages were made from the treated mice and when resistance was apparent, and this generally occurred suddenly, normal mice were then used for further treatment. This resistance, even when acquired to considerable degree, did not persist for long in the case of antrycide after drug treatment was discontinued. The antrycide-resistant strain also proved resistant to the basic drugs dimidium and stilbamidine and to a lesser extent to acriflavine but not to acidic types like suramin, trypan blue or *p*-hydroxyphenylarsine oxide. Examination of the cytoplasm of the resistant strain showed the presence of granules which were not seen in the normal strain. Some reactions of these two strains with 2-hydroxystilbamidine are described. Whereas the cytoplasmic nucleoprotein of the normal strain is believed to react with the drug as suggested above, that of the resistant strain is thought to remain unaffected and the cell suffers no damage.

J. D. Fulton

WIGGLESWORTH, V. B. **The Thoracic Gland in *Rhodnius prolixus* (Hemiptera) and its Role in Moulting.** *J. Exper. Biol.* 1952, Dec., v. 29, No. 4, 561–70, 6 figs. [36 refs.]

WIGGLESWORTH, V. B. **Hormone Balance and the Control of Metamorphosis in *Rhodnius prolixus* (Hemiptera).** *J. Exper. Biol.* 1952, Dec., v. 29, No. 4, 620–31, 2 text figs. & 12 figs. on 2 pls. [29 refs.]

BETTINOTTI, C. M. Las cardiopatías y la enfermedad de Chagas. Estudio serológico—nota previa. [**Cardiopathy and Chagas's Disease. Serological Study. Preliminary Note**] *Semana Méd.* 1952, Nov. 20, v. 101, No. 21, 675–80. [37 refs.]

This study is based on examination of the blood of 100 persons presenting themselves for treatment on account of cardiovascular symptoms or who thought

they were suffering from cardiac trouble. The method used was fixation of complement according to the Davis technique [see this *Bulletin*, 1943, v. 40, 890]. Seventy-six of the 100 patients were living in the town of Córdoba, and most of these had been born there ; 21 were from the Province of Córdoba 1 was from Santa Fé ; the domiciles of 2 were unknown. Thirty-nine proved definitelv positive, 5 weakly positive [these are considered as 44 positive in the rest of the paper], 55 were negative and 1 doubtful [regarded as 56 negative]. Reference was made to the recorded medical histories of the patients. Of the 44 positive, 27 had been diagnosed as " cardiopaths " and 4 had definite cardiac disturbance, giving a total of 31 with heart trouble ; 4 presented no cardiac changes and in the other 9 the investigation of the heart was incomplete (*sin estudio cardiologico terminado*). Of the 56 negative with c.f. 23 were cardiopaths, 14 had hearts apparently healthy, in 19 the investigation was incomplete.

Analysing these figures in another way, we may say that of the 54 with definite cardiac changes 31 gave a positive c.f. and 23 were negative.

The author next proceeds to comment on the various laboratory methods used in the diagnosis of infection of man by *T. cruzi*. The value of the procedures differs according to the period of the disease. Thus, in the chronic stages examination of the peripheral blood, or gland or sternal puncture for parasites is of little value and the best method is by animal inoculation into mice, guinea-pigs or puppies if the patient has been infected for 5–6 months ; but even this is not constant and a negative result does not rule out the disease. Agglutination and precipitation are serviceable only in acute and subacute forms ; MAYER and PIFANO's intradermal test may be of use but has not been sufficiently tried as yet ; the same applies to agglutination of sensitized red corpuscles. " Conditioned haemolysis " [*ibid.*, 1951, v. 48, 965, 966, 967] described by MUÑIZ is said to be as good as, if not better than, fixation of complement. The Machado-Guerreiro reaction, he states, is now only of historic interest. There is no doubt that many cases go unrecognized or undiagnosed and many are not even suspected and this being so there is no little danger of transmission of the disease by blood transfusion, unless the blood has been stored long enough (10 days) for the parasites to have died [*ibid.*, 1952, v. 49, 678]. Wholesale destruction of Triatomidae in the houses is justifiable, as by Gammexane or dieldrin.

[References to the above points in the *Tropical Diseases Bulletin* are numerous ; in addition to those mentioned above attention may be drawn to the following : 1945, v. 42, 974, 975 ; 1946, v. 43, 719, 1026 ; 1947, v. 44, 405 ; 1948, v. 45, 54, 314, 315 ; 1949, v. 46, 20, 125, 1129 ; 1950, v. 47, 121, 123 ; 1951, v. 48, 1093 ; 1952, v. 49, 127, 495, 606.] *H. Harold Scott*

LEISHMANIASIS

MOHIUDDIN, A. **An Investigation into the Relationships between the Species (Parasitic in Man) of the Genus *Leishmania* Ross, 1903. Part II. The Serological Relationship and Pathogenicity of the various Species.** *Indian J. Med. Res.* 1952, Apr., v. 40, No. 2, 171–92, 10 figs. on 5 pls. [Numerous refs.]

The title of Part I of this paper was given in this *Bulletin*, 1952, v. 49, 1104. Part II completes the publication, in condensed form, of the author's thesis reviewed in this *Bulletin*, 1950, v. 47, 828. It has been brought up to date by consideration of relevant papers which have appeared since the presentation of the thesis in 1948. *C. A. Hoare*

ROMANO, S. & IANNUZZI, B. Attività profilattica e terapeutica di un Centro antileishmaniotico in provincia di Salerno nel triennio 1949–51. [**The Work of Prevention and Treatment at a Leishmaniasis Centre in the Province of Salerno during 1949–51**] *Ann. d. San. Pubblica.* Rome. 1952, July–Aug., v. 13, No. 4, 1095–105. [27 refs.] English summary (3 lines).

Sporadic cases of oriental sore are known to have occurred from time to time since 1927 but there was an outbreak of cutaneous leishmaniasis in the province of Salerno during the years 1949–51 among a population of 3,000 at risk. The special treatment centre was set up in Auletta, which was one of the worst affected villages, and every effort was made to discover cases and to encourage them to attend for treatment. A table shows the number dealt with in each quarter, giving a total of 257 patients and an incidence rate of 85 per thousand for the 3-year period. In the first year, 206 were treated with the use of local infiltration of the lesions with 10 per cent. atebrin [mepacrine] and 91·5 per cent. of cures were obtained with 3·5 per cent. relapsing. An average of 3 infiltrations had to be given in each case. The remaining 51 patients, from 1950, were given general treatment with N-methyl-glucamine antimoniate (Glucantime), 3 gm. daily for 10–15 days in aqueous solution for adults ; in a minority of cases a second similar course had to be given after a week's rest. This general treatment was administered in cases of relapse from, and where lesions were too numerous for, local treatment. [The figures given suggest that cases of relapse may have been counted as new cases.] The antimony treatment failed in 5·8 per cent. of cases. The antimony preparation seemed well tolerated on the whole.

There was DDT treatment against the *Phlebotomus*, but as this DDT spraying had been already in operation against malaria and fly-borne disease since 1947, the events demonstrate the preventive importance of finding out and treating the cases in the control of this disease. *J. Cauchi*

LAVERDE, A. La leishmaniose américaine dans les hôpitaux de Bogota (Colombie). [**American Leishmaniasis in the Hospital of Bogotá, Colombia**] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 1, 78–86, 6 figs. on 4 pls. [14 refs.]

A series of 29 cases of South American muco-cutaneous leishmaniasis is reported. The patients, who were treated in hospital in Bogotá, Colombia, came from the departments of Boyacá, Cundinamarca, Huila, Tolima, Santandares and des Llanos, all tropical regions.

Of the 29 patients, one presented mucous lesions only, 8 cutaneous lesions only and 20 muco-cutaneous lesions. The patients were aged 12 to 75 ; 6 only were women.

In some the muco-cutaneous lesions were continuous with the cutaneous lesions but in others the latter were at a distance, *e.g.*, on the limbs. The differential diagnosis was from yaws, syphilis, sporotrichosis and blastomycosis. The diagnosis was usually made on clinical grounds and by the exclusion of the above conditions by laboratory examinations. Leishmaniae were seldom found in the mucous lesions. The response to treatment was also taken into consideration in the making of a diagnosis.

There was a moderate hypochromic anaemia and the sedimentation rate was increased, in all cases, 40 to 50 mm. in one hour, but the aldehyde reaction was negative.

Of the 29 patients, 14 were treated by injections of N-methyl-glucamine antimoniate [Glucantime, RP 2,168]. This drug is supplied in ampoules containing 5 ml. of a 30 per cent. solution in distilled water ; each thus contains 1·5 gm. of the antimoniate, or 0·425 gm. of antimony.

The dosage given was usually a little less than the recommended maximum dose of 100 mgm. per kgm. body-weight. As a rule injections were given daily for 10 days and the course was repeated after an interval of 15 days.

The total number of ampoules given varied from 23 to 145 before complete cure was effected. There was improvement in each of the 14 cases in which treatment with glucantime was used ; one patient, however, left hospital after one course of treatment had caused considerable amelioration in his condition, and a second patient, aged 75, with arteriosclerosis and hypertension, died of cerebral haemorrhage during the second course of treatment after exhibiting considerable improvement in the local lesions. There was usually improvement in the local lesions after the eighth injection. The only unfavourable effect was slight pain at the site of the injection.

The results of the treatment of the other 15 cases are to be reported later. The appearances of some of the lesions before and after treatment are shown in 6 excellent photographs. *L. E. Napier*

FEVERS OF THE TYPHUS GROUP

Le Gac, P., Giroud, P. & Lemaigre, C. La forêt équatoriale doit-elle être considérée comme une zone endémique des rickettsioses ? Comportement des pygmées de la Lobaye, Oubangui-Chari (A.E.F.) vis-à-vis des antigènes des typhus épidémique, murin, de la fièvre boutonneuse et de la fièvre Q. **[Are the Rickettsioses Endemic in the Equatorial Forest Region ? The Response of the Pygmies of Lobaye, Oubangui-Chari, to the Antigens of Epidemic Typhus, Murine Typhus, Boutonneuse Fever and Q Fever]** *Bull. Soc. Path. Exot.* 1952, v. 45, No. 5, 599–602.

In the region of Lobaye, Oubangui-Chari, 80 of the forest-dwelling pygmies were persuaded to submit to the hypersensitivity tests for the chief rickettsial fevers, but owing to their extreme timidity each person was subjected to only one test so that the following figures apply to groups of 20 persons. Positive reactions for each group were : with murine antigen, 5 ; with boutonneuse antigen, 5 ; with epidemic antigen, 7 ; and with Q fever antigen, 2. In the savannas of Oubangui-Chari the number of reactions was much higher ; among 58 persons, 49 reacted with murine typhus antigen ; 42 with boutonneuse antigen, and 8 with epidemic typhus antigen. In the central region of Oubangui-Chari, where domestic cattle are numerous, 35 per cent. of the people reacted with Q fever antigen.

The results are regarded as suggesting that the scarcity of vectors of the fevers is the cause of the low incidence of the rickettsioses among the forest-dwelling pygmies. *John W. D. Megaw*

v. Bormann, F. Die in New York und Boston unter dem Namen " BRILLsche Krankheit " bekannten Fleckfiebererkrankungen und die Frage der Spätrückfälle beim klassischen Fleckfieber. **[The Typhus Fevers known in New York and Boston as Brill's Disease, and the Question of late Relapses in Classical Typhus]** *Ztschr. f. Hyg. u. Infektionskr.* 1952, Nov. 4, v. 135, No. 5, 448–71, 1 fig. [31 refs.]

This long paper of 23 closely printed pages is likely to give rise to heated controversy. The author has marshalled an impressive series of facts and arguments which he regards as disproving Zinsser's hypothesis that Brill's

disease is a late-relapsing form of classical typhus caused by the resurgence of rickettsiae that have lain dormant ever since a previous attack of the disease, which may have occurred several or many years ago. The pathogenic organism has been proved beyond doubt to be *Rickettsia prowazeki*. The main epidemiological features have been described by ZINSSER who studied the records of 538 cases reported in the U.S.A. between 1902 and 1934 ; 434 of the cases occurred in New York in 1910–1933, and 44 occurred in Boston. Of the 538 patients 503 (94·8 per cent.) were born abroad, but a significant fact was that 22 were born in the U.S.A. and their illness could not be regarded as a relapsing form of typhus. Of the 503 born abroad 471 (93·6 per cent.) came from places in eastern Europe where typhus fever was endemic, and about 95 per cent. of all the patients were Jewish. Among 126 patients whose history was specially investigated to find the time relationship between their illness and the date of their arrival in the U.S.A. it was found that 26 were attacked after 1–10 years' residence and 95 after more than 10 years' residence, including 13 who had been more than 30 years in the U.S.A. There were, however, 2 whose illness began before disembarkation and 3 who had been about 10 days in Boston after their arrival. The disease was strikingly sporadic in its occurrence ; among 494 cases studied it was found that only 8 patients had been attacked in residential buildings where more than one person was affected.

Among the objections to Zinsser's hypothesis the following are mentioned :— (1) The occurrence of 22 cases among the indigenous population. (2) The absence of evidence that *Rickettsia prowazeki* is present in man except for brief periods during attacks of typhus fever. Rickettsiae have been isolated from afebrile persons having a history of previous attacks of typhus fever, but in these cases the organisms have turned out to be *Rickettsia pediculi*, alias *R. wolhynica*. *R. prowazeki* has also been isolated from apparently healthy persons who were living in close contact with typhus patients, but the organisms have always disappeared within a few days and so must have been associated with inapparent attacks of typhus fever. (3) In the first world war German troops on the Eastern Front and allied troops in North Africa became heavily infected with typhus fever and trench fever, yet these troops when serving later on the Western Front in louse-infested trenches did not suffer from typhus nor did they act as reservoirs of typhus infection, but trench fever was exceedingly common and *R. wolhynica* was shown to persist long after attacks of the illness, sometimes up to at least a year. (4) Late relapses of typhus fever are unknown in regions where the disease is endemic ; second or even third attacks are known to occur 5–10 years or more after the previous attack but in these cases the epidemiological conditions have always been compatible with transmission by lice. Among more than 10,000 German soldiers who suffered from typhus during the first world war and afterwards lived in localities free from the risk of infection no case of late relapse has ever been detected.

Circumstances favouring the view that the disease results from transmission of infection by lice are that during the years 1880–1930 the average number of Jewish immigrants to New York from the ghettos of East Europe was about 60,000 yearly and that by no means all of these were completely disinfested before arrival. In view of the fact that lice infected early in their life with *R. prowazeki* sometimes remain infective as long as 2–3, or even 4, months the occurrence of 300 cases due to louse transmission among the 1,500,000 Jews of New York in 1910–1920 and of 194 cases in 1921–1933 is not surprising. The special incidence of the disease among the earlier Jewish immigrants from the same places in Europe is explained by the fact that the newcomers nearly always settled down in the " biological ghettos " already occupied by their friends and relatives who came from these localities, and who, with the lapse of time, had lost much of the immunity they originally possessed. The relative

mildness of the disease is explained by the persistence of partial immunity and by the conditions of transmission by small numbers of lightly infected lice.

The author deals at some length with the various recent descriptions of the occurrence of Brill's disease in several European countries and gives reasons for regarding louse transmission as an adequate explanation of all the cases described.

[The paper deserves careful study by everyone interested in the epidemiology of louse-borne typhus. Readers will be surprised to find how strong a case has been made against acceptance of a hypothesis which has come to be regarded as a definite explanation of Brill's disease.] *John W. D. Megaw*

Weyer, F. & Peters, D. Untersuchungen zur Rickettsienmorphologie. I. Mitt. : Eine einfache und Schonende Präparationsmethode für die elektronenoptische Untersuchung von Rickettsien. [**Investigation of the Morphology of the Rickettsiae. A Simple and Economical Method of Preparing Rickettsiae for Examination by the Electron Microscope**] Reprinted from *Ztschr. f. Naturforsch.* 1952, v. 7b, No. 6, 357–61, 13 figs. on 3 pls. [Refs. in footnotes.]

The method of preparing rickettsiae for investigation by the electron microscope which the authors describe is certainly simple but it does not appear that simplicity has been achieved at the cost of ineffectiveness.

Rickettsial cultures are obtained by intrarectal inoculation of human lice whose infected stomachs are dissected out after a suitable interval, slit open and well washed in distilled water. Smears are made at once on the collodion films used in electron microscopy and after a few minutes are washed several times with a jet of distilled water. Excess fluid is removed with blotting paper and the film is allowed to dry at 60°C. ; it is then ready for examination. The paper is illustrated by 12 photographs taken with the electron microscope at magnifications ranging from 2,500 to 15,000 ; these show *Rickettsia quintana*, *R. prowazeki* and *R. mooseri* prepared by the authors' method and by the methods hitherto employed, such as fixation by alcohol (80–96 per cent.) or washing in normal saline. Comparison of the photographs shows that with the authors' method the finer structural details are much better preserved and there is an absence of the granulation and distortion of the cell contents which occur in the other films. There is also a much reduced tendency to polymorphism. The authors discuss the prospect opened up by the method of gaining a better insight into the structure of the rickettsiae. Details of the technique and a critical summary of the literature, with 20 references, are given in the paper. *John W. D. Megaw*

Giroud, P., Le Gac, P., Jadin, J. & Gaillard, J. A. Les tests cutanés dans l'étude des cinq rickettsioses majeures : typhus épidémique, typhus murin, fièvres du groupe boutonneux-pourpré, fièvre Q, fièvres du groupe oriental. [**Cutaneous Tests in the Study of the Five Major Rickettsioses**] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 5, 632–45.

The authors summarize the numerous studies of the intradermal hypersensitivity test for rickettsial fevers which was introduced by P. Giroud in 1938 and has been extensively applied by him and his collaborators. References are given to about 30 papers by Giroud alone or by him in collaboration with others ; most of these have been abstracted in this *Bulletin*.

The test has not been so widely applied by other workers as would have been expected in view of its simplicity and wide range of applicability in the retrospective detection of rickettsial infection. Only 7 references are given to the

findings of workers not associated with the authors. Now that an admirable summary of the whole subject is available it is to be hoped that the possibilities and limitations of the test will be fully explored. The authors claim that the test is comparable to the tuberculin test and that the results of their experiments fully confirm the existence in Africa of all the 5 major rickettsioses. When the reaction is applied to the preparation of an epidemiological survey it is necessary to select persons with a normal skin and in good health ; in such conditions the tests are claimed to have an absolute value in providing an index of the incidence of each type of rickettsial fever. The authors would like to see the adoption of this index all over the world for the determination of the incidence of the rickettsioses.

John W. D. Megaw

WERTMAN, K. & SARANDRIA, J. L. **Complement-Fixing Murine Typhus Antibodies in Vitamin Deficiency States. IV. B_{12} Deficiency.** *Proc. Soc. Exper. Biol. & Med.* 1952, Nov., v. 81, No. 2, 395–7.

In previous studies the authors have shown (1) that pantothenic-acid and thiamine deficiency adversely affected the complement-fixing antibody response of rats to small doses of murine-typhus antigen, but had a less apparent effect when larger doses were given ; (2) that pyridoxin deficiency caused impairment of the antibody response to the same antigen when given in doses to which an adequate response was made by rats deficient in nicotinic acid, and (3) that the riboflavin requirement of the diet was not so important as that of folic acid for antibody production. [See this *Bulletin*, 1951, v. 48, 726 ; 1952, v. 49, 256, 1107.]

In the present studies the influence of vitamin B_{12} deficiency was tested on the same lines ; this caused pronounced interference with antibody production in response to both small and large doses of murine-typhus antigen.

With small doses the rats on deficient diets produced no complement-fixing antibodies, whereas 17 of 19 rats on inanition diets and 19 of 21 on ideal diets developed antibodies at titres of 1–10 to 1–40. With larger doses the deficiency rats showed titres of 1–80 to 1–320 except for one animal whose titre was 1–640. With the same doses all the rats on normal diets had titres of 1–640 to 1–2,560 and all the rats on inanition diets had titres of 1–320 to 1–1,280. It was concluded that vitamin B_{12} deficiency rather than inanition was the significant factor in reducing the production of complement-fixing antibodies.

John W. D. Megaw

TECCE, Nicola. La parotite nel dermotifo. [**Parotitis in Exanthematic Typhus**] *Acta Med. Italica.* 1952, Sept., v. 7, No. 9, 229–34, 8 figs. [Numerous refs.] English summary.

This is a description, illustrated by 8 photomicrographs, of the histopathological changes observed in 16 cases of parotitis in typhus fever during the great Naples epidemic of 1943–44. Three types of the condition are described : (1) The *serous type* seen in 8 cases. The chief feature was oedema of the interstitial connective tissue. (2) The *infiltrative type* seen in 5 cases. In this there was progressive infiltration of the interstitial tissue, especially round the gland ducts, and pronounced dilatation of the larger blood vessels with compression of the capillaries. The cells of the infiltrate were small and mononuclear of the lymphatic type but there were also eosinophile and plasma cells suggestive of an allergic reaction ; the author regards this and the serous type as being caused by the development of rickettsial allergens. (3) The suppurative-necrotic type,

seen in 3 cases. In this the infiltrative type has undergone inflammatory and necrotic damage caused by secondary invasion of the tissues by septic organisms.

John W. D. Megaw

See also p. 340, CHAMBERLAIN, **Ocular Findings in Scrub Typhus.**

JONCHÈRE, H., PFISTER, R. & RIDET, J. Fièvre exanthématique du groupe typhus à tiques à Bobo-Dioulasso (Haute-Volta). [**An Exanthematic Fever of the Tick-Typhus Group in Bobo-Dioulasso (Upper Volta)**] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 5, 626–32.

This is a description of 12 cases of fever which occurred during the rainy season (July–October) in 1951 among the 1,380 Europeans of Bobo-Dioulasso in the Upper Volta region of French West Africa. The clinical epidemiological and serological features of the disease pointed to a fever of the tick-typhus group. The attacks were sporadic ; 11 of the patients were adult males who had been exposed to special risk of tick bite in the scrub lands of the area though all did not know that they had been bitten.

An inoculation eschar occurred in 3 cases ; the rash was generalized and was definitely papular ; it persisted after defervescence. Aureomycin and chloramphenicol had a pronounced action on the course of the illness.

The Weil-Felix reaction was positive in rising titre in 8 of the 12 cases. The reaction was predominantly of the *Proteus OX2* type though in 2 cases the reaction with *P. OX19* was at a higher titre than that with *P. OX2*.

Sera of 236 healthy Africans of the locality were tested ; 61 of these reacted with *P. OX2*, 8 with *P. OXK* and 2 with *P. OX19*. Among 17 recently arrived Europeans none reacted with any of the types of *Proteus OX*.

Attempts to recover rickettsiae from the patients or from ticks were unsuccessful.

John W. D. Megaw

PHILIP, C. B. A propos des noms de la " Q Fever " et de son agent pathogène. [**Note on the Nomenclature of Q Fever and its Pathogenic Agent**] [Correspondence.] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 5, 576–8.

At a meeting of the *Société de Pathologie Exotique* in October, 1951, Q fever was referred to as the Derrick-Burnet disease and its pathogenic agent as *Rickettsia burneti*. In the present note Dr. Philip points out that the only accepted name of the disease is Q fever and he claims that the name *Coxiella burnetii* (Derrick-Philip) is in accordance with the International Code of Bacteriology [International Rules of Botanical Nomenclature] and has been accepted by Bergey's *Manual of Determinative Bacteriology* (6th edition, 1948). Dr. Philip in 1943 proposed that the organism should be transferred from the genus *Rickettsia* to *Coxiella* as a sub-genus [this *Bulletin*, 1943, v. 40, 828], but he agrees with STEINHAUS, BENGTSON and others that fuller information justifies its being regarded as a separate genus. In conformity with the Code of Bacteriology a second *i* is added making the name *burnetii* instead of *burneti*.

John W. D. Megaw

STOKER, M. G. P. & THOMPSON, J. F. **An Explosive Outbreak of Q Fever.** *Lancet.* 1953, Jan. 17, 137–9, 1 fig. [10 refs.]

Between the 1st and 17th September, 1951, 16 proved cases of Q fever occurred among the 25 persons living in, or visiting, a farm in south Kent ; all but 3 of the cases occurred within the first 8 days of the month.

Among the 15 persons living at the farm and adjoining cottages at the time 13 were attacked ; the 2 who escaped were children aged 5 and 10 years and the former of these was later found to have developed complement-fixing antibodies of Q fever ; the latter was not tested. Of the other 3 patients 2 were daily domestic helpers at the farm house and the third had spent the afternoon of August 16 on a visit to the house. The infection rate was therefore 100 per cent. among the 13 residents who were tested and was 77 per cent. among the 25 persons at risk, including all who visited the farm.

Tests of the 10 cows on the farm at the time of infection were negative and none of these had calved during the infective period. The whey of one of two cows which had gone dry and been put out to pasture 2 miles from the farm on August 5, later gave a positive rickettsia-agglutination test at a titre of 1–16 with the direct method and at 1–64 with the anti-globulin sensitization test, carried out early in 1952 when she began her next lactation.

The pigs of the farm fell under suspicion ; 2 litters were born on August 10 and a sow aborted on August 18. One of the piglets born on August 10 was injured by a rat and was brought into the house for treatment on August 16, when it was fondled by several persons who later were attacked ; one of these persons was the lady who spent the afternoon of August 16 at the house and who almost certainly became infected on that day. Various tests of this and 8 other piglets and of 3 sows on the farm were made on October 27 and on later dates but no evidence of infection was found.

The authors were naturally disappointed at being unable to identify the source of infection, especially as the dates of infection could be fixed with reasonable certainty as falling within the period of August 16–19, during which 4 of the patients must have become infected.

It is mentioned that pig antibodies are notoriously difficult to detect by ordinary techniques and that on epidemiological grounds the pigs were far more likely than the cattle to have been the source of infection.

John W. D. Megaw

GIROUD, P. & GOULON, M. Maladie de Derrick et Burnet ou " fièvre Q " en France. [**The Derrick-Burnet Disease or " Q Fever " in France**] *Bull. Inst. Nat. Hyg.* Paris. 1952, Oct.–Dec., v. 7, No. 4, 877–83.

Although the authors give precedence to the name Derrick-Burnet disease in the title of this paper they almost invariably use the orthodox name " Q fever " in the text. PHILIP has pointed out that the only accepted name of the disease is Q fever. [See above, 1953, p. 299.]

It is stated that only 3 epidemics have been reported in France ; one in Strasbourg in 1948 and 2 small outbreaks among post-office workers who were believed to have been infected by inhalation of dust from mail bags contaminated by being carried in railway wagons used for the transport of cattle. A few sporadic cases are described. The low incidence of infection in France is shown by the results of rickettsia-agglutination tests of 1,838 sera from all over France [presumably from unselected persons]. Only 48 were positive, at titres of 1–40 to 1–60.

The intradermal test is said to be specially useful for epidemiological surveys but is not recommended for diagnosis because of the risk of causing grave allergic reactions in persons recently attacked by the disease.

A few " tests " [presumably rickettsia-agglutination] of domestic animals are mentioned ; positive reactions occurred in 3 of 36 cattle ; in 2 of 27 sheep ; in 2 of 29 goats ; in 7 of 21 pigs and in 9 of 24 dogs.

The places from which human reacting sera came were the Paris and Lyons regions, Allier, Strasbourg, Nancy, Avignon and Ardèche, but the number of sera tested from each locality is not stated. *John W. D. Megaw*

COURDURIER, J., BÜCK, G. & QUESNEL, J. J. Recherches sur la " Q. Fever " à Madagascar. 1re note : recherches sérologiques. [**Investigation into Q Fever in Madagascar**] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 5, 602–4.

Uniformly negative results were observed in complement-fixation tests of sera from the following sources :—15 workers on a cattle-raising farm in a place 200 kilometres west of Tananarive ; 15 workers in the slaughter house of Tananarive, and 201 cattle, most of which came from the western part of Madagascar. Further surveys are contemplated. *John W. D. Megaw*

LOPES, A. La intradermoreazione nella febbre Q dell'uomo. [**The Intradermal Test in Human Q Fever**] *Ann. d. San. Pubblica.* Rome. 1952, July–Aug., v. 13, No. 4, 1135–43, 2 figs. English summary (5 lines).

The Giroud intradermal reaction with Q fever antigen was tested in 121 persons living in an area where Q fever was endemic. The results suggest that the test is more sensitive than the complement-fixation test. It was positive in 92 cases, in 71 of which there was also a positive reaction with the fixation test at titres ranging from 1–4 to 1–256 or over. The fixation test was positive, but at low titres of 1–4 to 1–8, in 4 cases in which the dermal reaction was negative. In all the 34 cases in which the complement-fixation titre was 1–10 or over the dermal reaction was definitely or strongly positive (++ to ++++). The general agreement between the two tests was 76·1 per cent. ; the discrepancies were 23·9 per cent. made up of 20·6 per cent. with positive dermal and negative fixation reactions, and 3·3 per cent. with negative dermal and positive fixation reactions.

All of 14 persons who were known to have had Q fever 6–8 months previously reacted strongly (+++ to ++++).

The antigen employed was the Lederle " 1–16 " Henzerling strain ; one part of this was diluted with 1·5 parts of distilled water, and 0·1 cc. of the mixture was injected intradermally in the outer aspect of the upper arm.

Exceptionally there was an immediate, but fleeting, local erythema ; the true reaction became obvious after 24 to 48 hours. When the reaction was weakly positive (+) there was a small red spot with slight infiltration lasting 5–8 days. In definitely positive reactions (++) there was a local papular or pemphigoid erythema lasting 10–15 days. In strongly positive reactions (+++) there was inflammation of the area. In the most severe reaction (++++) there was local necrosis followed by ulceration ; there were only 3 cases of this type and in them there was a moderate general reaction, malaise, headache, a slight rise of temperature, and adenopathy of the axillary glands.

John W. D. Megaw

FAVEZ, G. Les analogies radiologiques et cliniques de la fièvre de Queensland avec la tuberculose dans leurs manifestations pulmonaires. [**The Analogies between the Radiological and Clinical Manifestations of Queensland Fever (Q Fever) and of Tuberculosis**] *Helvetica Med. Acta.* Basle. Ser. A. 1952, May, v. 19, No. 2, 150–70, 16 figs. & 1 chart. [13 refs.]

[It must again be pointed out that the name Queensland fever is wrong and misleading ; the letter Q in Q fever is an abbreviation of the English word query and refers to the questionable nature of the disease when it was first discovered.]

The author briefly describes and illustrates with clear X-ray photographs 15 cases of Q fever which were selected to show how closely the disease may simulate the early stages of pulmonary tuberculosis.

Eight radiological types of pulmonary involvement in Q fever are described and each of these is shown to have its counterpart in tuberculosis of the lung. The clinical features of the two conditions may also be very similar ; in Q fever there may be a prodromal stage lasting 1–2 weeks with malaise, lassitude, a slight dry cough and a subfebrile temperature. During the fever profuse night sweats have been observed in more than one-third of the cases ; the cough is usually dry, but occasionally there is purulent or blood-stained sputum. The physical signs of the two diseases may be indistinguishable. The fever curve of Q fever is very variable and has no characteristic feature. Haematological examination reveals no diagnostic feature till the development of complement-fixing antibodies. There is, therefore, a variable period, which may be of considerable length, during which Q fever may be mistaken for early pulmonary tuberculosis and the unfortunate consequences of the error in diagnosis can easily be imagined. *John W. D. Megaw*

YELLOW FEVER

DE RODANICHE, Enid C. **Survey of Live Forest Animals for Protective Antibodies against Yellow Fever in Panama, R.P.** *Amer. J. Trop. Med. & Hyg.* 1952, Sept., v. 1, No. 5, 789–95. [19 refs.]

This paper presents the results of yellow fever neutralization tests on the sera of live animals captured in various sections of Panama. De Rodaniche is of the opinion that the testing of live-caught animals offers certain advantages over shot animals in that repeated bleedings may be done to clarify inconclusive and unsatisfactory results and that non-specific reactions due to contamination and haemolysis are avoided. [The evidence that haemolysis of samples produces non-specific results in neutralization tests is not stated. If there is good evidence on this it would be of value to have.]

All sera were tested by a 10 per cent. intraperitoneal test in adult Swiss albino mice which had previously received an intracerebral inoculation of starch as devised by SAWYER and LLOYD [this *Bulletin*, 1932, v. 29, 198]. De Rodaniche is of the opinion that great sensitivity is at times disadvantageous in survey work [with which the abstracter fully agrees].

The results of tests on 209 monkeys showed that 12 were positive (5 of 85 *Marikina geoffroyi* (squirrel marmosets), 4 of 24 *Ateles geoffroyi panamensis* (red spider monkeys), 2 of 21 *A. fusciceps robustus* (black spider monkeys), and 1 of 35 *Aotus zonalis* (night monkeys). The places and year of capture are recorded [a map would have been of value]. Of the 6 positive spider monkeys, 5 were classified as juveniles, 3 were received in 1949 and 2 in 1950, from which it is concluded that virus was active in the vicinity of the Bayano and Gatuncillo rivers (where the monkeys were trapped) in 1948 and 1949.

Tests were also made on sera of 58 non-primates ; positive results were obtained in 2/13 agoutis (*Dasyprocta punctata*) and 1/5 pygmy anteaters (*Cyclopes didactylus dorsalis*). The positive results in the case of the agoutis were found in sera stored in the frozen state for 2 weeks, subsequent bleedings taken three months later and tested within 24 hours were inconclusive. One was bled 8 months later and was found to be negative. No attempt is made to interpret the results of the tests on sera of non-primates till further experimental work has been completed. *G. W. A. Dick*

RABIES

PELLEGRINI, D. La rabbia in un leone. [**Rabies in a Lion**] *Nuovi Ann. d'Igiene e Microbiol.* 1952, May–June, v. 3, No. 3, 231–3. English summary (2 lines).

A previously recorded case occurred in 1922 in a she-lion from Abyssinia aged 8 months. One of a consignment of 4 beasts to Paris, she seemed abnormal on arrival, sulked, kept to herself and would not eat. The next day she was restless and roaring in an unusual timbre of voice and this was followed by paralysis of the hind quarters within 24 hours, which spread to the fore quarters within another day and was followed by death. Negri bodies were demonstrated on histological examination.

A case is now described from Italian Somaliland in a 6-months-old she-lion which had been captured 2 months earlier. She had been fed on raw beef and liver and kept loose in a yard with a number of other animals including dogs : they all played together. The owner then noticed a change of temper, a lack of liveliness, a reluctance to play, a loss of appetite and a peculiar restlessness with frequent and unusual roaring. The beast became easily excitable, though not aggressive, and was inclined to bite if teased. At this stage it was thought wise to confine the beast by herself and she developed a gastro-enteritis, wasting and a terminal paralysis of the hind quarters followed by death within about 3 weeks from onset. Negri bodies were demonstrated post mortem and 14 serial subinoculations in laboratory animals have invariably reproduced the disease in the furious form. The she-lion is thought to have been bitten and infected by a stray dog about a fortnight before the signs of the disease set in.

J. Cauchi

TIERKEL, E. S., ARBONA, G., RIVERA, A. & DE JUAN, A. **Mongoose Rabies in Puerto Rico.** *Pub. Health Rep.* Wash. 1952, Mar., v. 67, No. 3, 274–8, 1 fig. [15 refs.]

In the Americas rabies has been diagnosed in practically every kind of susceptible wild animal. In the United States the principal campestral vectors have been foxes (*Vrocyon*), skunks (*Mephitis* and *Spilogale*) and coyotes (*Canis latrans*), while in South America, Central America, Trinidad and Mexico the vampire bat (*Desmodus rotundus*) is of great importance. In this paper the authors record the first outbreak of rabies, in an area of the Western hemisphere, attributed to the Indian mongoose (*Herpestes javanicus*). Although this species is prevalent in India it is not recorded as an important vector in that country ; in South Africa other species of the Viverridae are described as vectors. In this Porto Rico outbreak there has been secondary transmission to dogs, cats, cattle, goats and swine. An intensive island-wide trapping programme has been instituted as the primary method of control, and the census and vaccination of dogs, and collection and destruction of stray dogs.

G. W. A. Dick

KOPROWSKI, H. & BLACK, J. **Studies on Chick Embryo adapted Rabies Virus. III. Duration of Immunity in Vaccinated Dogs.** *Proc. Soc. Exper. Biol. & Med.* 1952, July, v. 80, No. 3, 410–15. [12 refs.]

A summary is given of the attempts which have been made to immunize dogs against rabies, from the experiments as early as 1826 and the later work of Pasteur. In view of the fact that a single infection method of canine vaccination with the use of the Flury strain has been developed [this *Bulletin*, 1950, v. 47, 846], Koprowski and Black have attempted to determine the duration of immunity conferred on dogs inoculated with this vaccine.

[The experiments recorded are not readily abstracted and the original paper should be consulted not only for the details but also as an example of how a thorough evaluation of a vaccine should be made.] It seems that vaccination with living virus is perhaps a more effective method of immunization of the canine population than any of the other methods presently available. This is concluded from the experiments recorded, together with those of HINDERSSON (*Munch. Tieraztl. Wochenschr.* 1936, v. 87, 37) who in an extensive field vaccination programme eradicated rabies in certain parts of Finland. Hindersson used a living fixed strain of rabies virus. Secondly, immunity after vaccination with the Flury strain lasts at least 2 years (Hindersson observed the first and only case of rabies in his field study 2 years and 3 months after vaccination).

The results of these observations indicate the need for reconsidering local ordinances and other regulations concerning rabies vaccination.

G. W. A. Dick

PLAGUE

POLLITZER, R. **Plague Studies. 6. Hosts of the Infection.** *Bull. World Health Organization.* Geneva. 1952, v. 6, No. 4, 381–465. [323 refs.]

This is the 6th of a series of studies which, when completed, will form a manual on plague to be published in English and French. The previous studies of the series have been reviewed in this *Bulletin*, 1952, v. 49, 388, 616, 690, 857; 1953, v. 50, 111.

This chapter of the work fully maintains the high standards of its predecessors; it is an orderly, concise and critical summary of existing knowledge of the proved and suspected animal hosts of *Pasteurella pestis*, with special reference to their importance in the transmission of human plague. There are 323 references to the literature of the subject and many more than this number of workers must have made their contributions to the great store of information contained in this article of 84 pages of text and tables.

The author begins by referring to the important epidemiological classification of plague proposed in 1928 by RICARDO JORGE who pointed out the fundamental difference between the pandemic type of plague, transmitted to man in settlements and houses by "domestic" rats and mice, and "*Peste selvatique*" [*Anglice* sylvatic plague] which occurs only among persons who have entered the haunts of rodents of the open country and wilds. Preference is given to the name "wild-rodent plague" for the latter type because the name sylvatic is likely to convey the wrong impression that the disease is one of forests. [In fact, however, the Latin name *sylvaticus*, when applied to animals, actually means wild rather than forestal and the names derived from it in Spanish, Italian and Portuguese convey the same meaning so that Jorge's nomenclature is fully justified on etymological grounds, though as it is likely to mislead English and French readers it may be preferable to use the name wild-rodent plague.]

The author also prefers to classify "plague rats and mice" as commensal rather than domestic, though he admits that neither name is strictly accurate because some of the wild rodents at times behave as domestic or commensal animals and serve as connecting links in the transmission of infection between the purely wild and the purely commensal rodents. Wild rodents are not the only hosts of plague infection in the open country, the *Lagomorpha* are also concerned in some countries but the number of species known to be naturally infected is only 14, compared with 175 species and sub-species of *Rodentia*.

A specially valuable feature of the article is the list of wild rodents and *Lagomorpha* in which natural plague infection has been definitely proved and

of others which are strongly incriminated by the discovery of infection in their ectoparasites. References are given to the localities from which each finding has been reported and to the workers concerned.

Only 3 commensal rodents are described, *Rattus norvegicus*, *R. rattus* and *Mus musculus* ; these are regarded as the only species, apart from a few local exceptions, that are implicated in plague outbreaks in man. The history of discovery of the part played by the commensal rodents is told ; YERSIN is quoted as having stated in 1894 that rats were the principal " vectors ", and a handsome tribute is paid to the Plague Research Commission which from 1905 onwards, under the leadership of LISTON and LAMB, produced findings which " formed an outstanding monument to scientific teamwork and were instrumental in defining the fundamental problems of plague in rats as well as in rat fleas ". *John W. D. Megaw*

COURTOIS, G. Remarques au sujet de la note de Fain et Coll. sur le traitement de la peste. [**Observations on the Note by FAIN *et al.* on the Treatment of Plague**] *Ann. Soc. Belge de Méd. Trop.* 1952, Oct. 31, v. 32, No. 5, 405.

The author refers to the observations by FAIN *et al.* [this *Bulletin*, 1952, v. 49, 389] of what were claimed to be the first bacteriologically confirmed cases of plague successfully treated in the Lake Albert District, Belgian Congo. He points out that in 1944 DEVIGNAT (*Rev. Méd. Moyen Orient*, 1944, v. 2, 580) recorded that, having seen no cures between 1928 and 1933, he observed 12 thereafter : 5 of 19 patients recovered after treatment with sulphonamides and 7 of 9 after the same treatment plus serum.

The present author saw two of such cases himself in Blukwa in 1944 : they recovered after treatment with Dagenan and serum. No doubt modern methods of treatment will multiply these fortunate results. [The Annual Medical Report of the Belgian Congo for 1951 records that 3 recoveries following treatment with streptomycin and sulphadiazine represented the first successfully treated confirmed cases of plague recorded in the Belgian Congo (this *Bulletin*, 1953, v. 50, 172). These were no doubt the 3 cases reported by Fain *et al.*] *H. J. O'D. Burke-Gaffney*

D'AMBROSIO, G. Il " Warfarin " nella lotta contro i roditori. [**Warfarin in Rodent Control**] *Riv. Italiana d'Igiene*. 1952, Sept.–Oct., v. 12, Nos. 9/10, 367–86, 6 figs. on pl., 2 text figs. & 1 graph. [10 refs.]

The English summary appended to the paper is as follows :—

" After a brief review of the references on the new rodenticide ' Warfarin ', i.e. 3-(alpha-acetonylbenzyl)-4-hydroxycoumarin, the author reports the results of some investigations carried out in the laboratory and under field conditions, in order to elucidate the mechanism of its toxic-dynamic action and its practical applications."

CHOLERA

GOHAR, M. A., EL-MOFTY, A., EISSA, A. A., MOUSA, A. H., SOROUR, A., DOSS, H., GOMA, T., ABOU EL-WAFA, M., EL-AZHARI, A., MITRI, S. & IBRAHIM, M. **Some Observations on the Carrier State in Cholera.** *J. Trop. Med. & Hyg.* 1952, Nov., v. 55, No. 11, 241–5. [12 refs.]

In the course of examination of contacts of cholera cases, during the 1947 outbreak in Egypt, vibrios agglutinable with O cholera serum were isolated

from 3·56 per cent. of stools and inagglutinable vibrios from 10·8 per cent. As a previous examination of a random sample of the population had shown the presence of inagglutinable vibrios in only 1 per cent. of samples it is inferred that " the rise in the incidence of non-agglutinable vibrios among contacts is not without significance ". It is stated that " the public health authorities considered inagglutinable vibrios corresponding with the cholera vibrio in other respects as potential sources of infection. That the cholera vibrio, under certain circumstances, may lose the property of agglutinability is a recognized fact, and it is not unlikely that this occurred in the epidemic in question. From the epidemiological point of view, therefore, the Egyptian public health authorities were probably justified in considering every vibrio carrier, whether the vibrio is serologically identified or not, as a potential transmitter of the disease." [This attitude is one which would be unlikely to be generally accepted.]

Contacts were found to excrete the vibrios in their stools for periods extending from 2 to 8 days with an average of 4·4 days. After the first negative test further positive isolations were not obtained although examinations were continued for 37 days. In view of this finding it was considered that intermittency of excretion is unlikely to occur or to be a factor in carrying over infection from season to season.

Treatment of contact carriers with sulphaguanidine, sulphathalidine, formocibazole, sulphadiazine, enterovioform or atebrin [mepacrine] was not found to reduce significantly the duration of excretion of the vibrio. The carrier state was also not affected by inoculation with anti-cholera vaccine except perhaps slightly in the case of persons inoculated more than 10 days before admission. No method of examination was found to be of value as a clue to whether a person excreting the vibrio might be an incubatory carrier.

The examination of 78 convalescents showed the maximum period of excretion to be 12 days except in the case of three in whom it extended to 20 days.

It is suggested that low acidity of the gastric juices may be a factor explaining individual susceptibility to infection. Achlorhydria was found in 75 per cent. of contact carriers, hypochlorhydria in 16·7 per cent. and normal acidity in 8·3 per cent. only. *J. Taylor*

ROGERS, L. **Progress in Control of Cholera in India by Inoculation of Pilgrims.** *Brit. Med. J.* 1952, Dec. 6, 1219–20.

The author refers to the part played by religious festivals and fairs in the dissemination of cholera in India and to his opinion, expressed in 1927, that cholera mortality could only be reduced under the existing conditions by the compulsory inoculation of pilgrims travelling through infected areas to attend festivals, such as the Khumb mela, which have frequently been the source of dissemination of infection. This suggestion was rejected at the time as being " impracticable, inexpedient and even dangerous ". In 1936, however, when the conditions appeared to be very favourable to the spread of cholera, at the time of the annual July fair at Pandarpur in the Deccan, which had year after year been infected, the responsible authorities made anti-cholera inoculation compulsory for all pilgrims proceeding to the fair. The spread of cholera was prevented and the procedure was also effective in the ensuing 5 years in the Bombay Presidency.

As a result, the Central Board of Health then recommended the trial of the method in other parts of India and recent reports have shown the value of the procedure. Figures are given which show the extent to which anti-cholera inoculation in India is now carried out. From an average figure of 2,700,000 inoculations annually in the years 1928–33 for all-India, the number for 8

provinces only in 1946 reached 19,858,000 and including the data for the remaining 3 provinces probably amounted to 24,000,000. The 1949 Madras State Health Report states that " anti-cholera inoculations had to be resorted to as *the sheet-anchor* in the defence against cholera, as the environmental hygiene conditions of the villages were far from satisfactory ". *J. Taylor*

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS

Scàffidi, V. & Scaletta, S. Osservazioni e ricerche sulla infezione amebica nella gente di mare. [**Report of an Investigation into Amoebic Infection among Seamen**] *Acta Med. Italica.* 1952, Aug., v. 7, No. 8, 197–202. [12 refs.] English summary.

This paper gives the results of a survey which the authors have carried out at Catania, Sicily, among 200 merchant seamen whose stools they examined for parasites and whose clinical history they investigated. To a certain extent, the group was a selected one in that it consisted mostly of (149) subjects with gastro-intestinal complaints with or without diarrhoea. The authors demonstrated the presence of *E. histolytica* in the stools of 4 subjects but their search seems to have been fruitless in the case of 4 others with an undoubted history of past infection and of another who was actually suffering from amoebic abscess of the liver. An amoebic incidence of 4·5 per cent. (9 cases in 200) is inferred by the authors who have presumably not accepted as positive 4 other cases in which other laboratories but not their own had reported the recent finding of *E. histolytica.*

The authors have estimated the corresponding incidence of amoebiasis among the resident population in their town to be 2·2 per cent. and they refer to the risk of seamen importing amoebic infection and being responsible for its spread among the inhabitants of seaport towns. *J. Cauchi*

Beltrán, E. Las familias del orden amoebida, con especial referencia a las formas parásitas. [**Families of the Order Amoebida with Special Reference to the Parasitic Forms**] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1951, Jan.–Dec., v. 12, Nos. 1/4, 59–64. [22 refs.]

Sadun, E. H., Krupp, Iris M. & Everritt, Martha G. **Cultivation of** *Endamoeba histolytica* **in Embryonic Fluids.** *Proc. Soc. Exper. Biol. & Med.* 1952, June, v. 80, No. 2, 272–5. [11 refs.]

A number of strains of *Entamoeba histolytica* accompanied by one, two or numerous bacterial species, were cultivated in embryonic fluids obtained from chick-embryos, women, bitches and cows at different periods of gestation. The fluids were distributed aseptically in amounts of 3·8 ml. in sterile test tubes. To check bacterial growth penicillin or streptomycin was added to the medium. It was found that the amoebae can be readily cultivated in embryonic fluids, the best results being obtained with amniotic and allantoic fluids from chick embryos 9–13 days old, and under anaerobic conditions. The fluids could be stored up to 30 days without losing the growth-promoting properties. By reducing considerably the concomitant bacterial flora, large numbers of amoebae were made available for physiological studies without bacterial interference.
C. A. Hoare

RIZZOTTI, G. Sulla eliminazione con le feci umane di trofozoiti d'*Entamoeba histolytica* aventi caratteri morfologici diversi da quelli abitualmente osservati. [**The Discharge, in Human Faeces, of Trophozoites of** *Entamoeba histolytica* **having Abnormal Morphological Characteristics**] *Riv. di Parassit.* Rome. 1952, July, v. 13, No. 3, 197–209. English summary.

The author regards the normal characteristics of the trophozoites (vegetative forms) of *E. histolytica* to be those described by CRAIG and FAUST whom he quotes in the matter [this *Bulletin*, 1951, v. 48, 1159]. If, when seen in freshly passed stools, specimens of the parasite show reduced, or lack of, motility, a distinct nucleus, absence of definition between endoplasm and ectoplasm and presence of bacteria in the former, these properties are a departure from normality. In a number of cases, following a saline purgative, Rizzotti has found *E. coli* in its vegetative, precystic and cystic forms in the first one or two discharges, while the typical forms of *E. histolytica* only appeared in later discharges or in the evacuations which followed a second saline. He wonders whether *E. histolytica* may not have been present in an unrecognizable form in the earlier discharges as well, when only *E. coli* had been identified.

He gives particulars of 5 patients—all Ethiopians—in whom the result of examining serial specimens of stools following one or more saline purgatives is claimed to have demonstrated the gradual evolution of typical from atypical specimens of both *E. coli* and *E. histolytica*. In the first discharges following a saline given to 2 other patients the author found both atypical and typical forms of *E. histolytica* and no *E. coli*.

Rizzotti suggests that the atypical forms are due to various stages of degeneration, and that when such degeneration has taken place in the bowel the cystic form may be difficult to demonstrate in specimens of stool. *J. Cauchi*

BUCHMAN, E., KULLMAN, H. J. & MARGONIS, G. F. **Evaluation of the Complement Fixation Test in Amebiasis.** *Gastroenterology*. 1952, July, v. 21, No. 3, 391–9. [42 refs.]

After a brief reference to the literature on the subject the authors record their own experience of the complement-fixation test in amoebiasis. The main initial difficulty in the assessment of the test is the procurement of a reliable antigen. That employed in this work was a saline extract of the "103" strain of *Entamoeba histolytica* grown together with a single species of bacteria according to the technique developed by REES *et al.* [this *Bulletin*, 1943, v. 40, 456] ; the details of the performance of the test followed that of KENT *et al.* (KENT and REIN, *Science*, 1946, v. 103, 598) ; and KENT, BUKANTZ and REIN [*Bull. Hyg.*, 1946, v. 21, 775].

Sera from 553 persons entering a Veterans' Hospital for a variety of troubles were tested by this means ; 502 of them gave negative tests and 2 were anti-complementary ; the remaining 49 gave positive complement-fixation tests for amoebiasis, 46 of the 49 were strongly positive and the other 3 weakly or doubtfully so. All the 49 positive sera gave negative Kahn tests. Two of the 49 men could not be examined further ; of the remaining 47 only one was proved parasitologically to have an *E. histolytica* infection and he, incidentally, was one of those giving a weak or doubtfully positive reaction.

The sera of a second group of 63 persons with parasitically proven infections with *E. histolytica* were examined ; 21 (33·5 per cent.) gave strongly positive tests, 3 gave a weak or doubtfully positive test, and 39 gave negative tests.

The authors conclude that their study of the complement-fixation test for amoebiasis confirms the view of previous workers that it is only of supportive

value in diagnosis and cannot be relied on as a screening procedure in the detection of the infection.

[To the abstracter it seems on these results that the test is quite unreliable.]

A. R. D. Adams

MOFTY, A. M. & EL-SAIFI, M. F. **Amoebiasis Cutis with Amoebic Vulvo-Vaginitis.** *J. Roy. Egyptian Med. Ass.* 1952, v. 35, Nos. 11/12, 786–93. [34 refs.]

LESTRADE, P. A propos d'un cas d'avitaminose B complexe chez un amibien. [**A Case of Vitamin B Complex Deficiency in a Patient with Amoebiasis**] *Méd. Trop.* Marseilles. 1952, Nov.–Dec., v. 12, No. 6, 688–92.

MATSUBAYASHI, H. **Treatment of Amoebiasis with special reference to the Localization of the Causative Organism.** *Keio J. of Med.* Tokyo. 1952, May, v. 1, No. 2, 95–105. [11 refs.]

It is stated that emetine alone often fails to eradicate the amoebic infection in cases of amoebic dysentery ; whereas when emetine is followed by a course of carbamisine [4-carbamidophenylarsonic acid] the infection is cleared. Carbamisine given alone suffices to eradicate the symptomless infections.

[The data on which these statements are based are scanty, and the criteria of " cure " are not stated.] *A. R. D. Adams*

GAMBARDELLA, A. Ulteriore contributo al trattamento clorochinico (Resochin Bayer) dell'epatite amebica emetino-resistente. [**Treatment of Emetine-Resistant Amoebic Hepatitis with Chloroquine**] *Acta Med. Italica.* 1952, Oct., v. 7, No. 10, 255–64, 2 graphs. [20 refs.] English summary.

OSBOND, J. M. **Chemical Constitution and Amoebicidal Action. Part II. Synthesis of 2-(1 : 2 : 3 : 4-Tetrahydro-6 : 7-Dimethoxy-2-Methyl-1-*iso*quinolylmethyl)-1-(1 : 2 : 3 : 4-Tetrahydro-6 : 7-Dimethoxy-1-*iso*quinolyl)-Butane and -Pentane and other Analogues of Emetine.** With a biological note by J. D. FULTON & D. F. SPOONER. *J. Chem. Soc.* 1952, Dec., 4785–92.

CARRERA, G. M., SADUN, E. H. & FAUST, E. C. **The Effect of Protein Deficient Diets on the Susceptibility of Guinea Pigs to Infection with *Endamoeba histolytica*.** *Amer. J. Trop. Med. & Hyg.* 1952, Nov., v. 1, No. 6, 966–9, 1 fig.

" Three similar groups of guinea pigs were fed respectively an adequate diet, a diet quantitatively deficient in protein and a diet qualitatively deficient in protein, for a period of 8 to 11 days, after which they were inoculated intracecally with *E. histolytica* trophozoites, were continued on the same diets, and were sacrificed 7 days later. The infectivity rates showed no statistically significant differences, and the gross and microscopic findings were similar in the three groups."

WEINSTEIN, P. P., GARFINKEL, B. T. & MILLER, M. M. **Treatment of a Case of Balantidial Dysentery with Terramycin.** *Amer. J. Trop. Med. & Hyg.* 1952, Nov., v. 1, No. 6, 980–81.

" A case of balantidial dysentery in a Korean responded favorably to terramycin given in divided doses over a 10 day period to total 17 grams. Trophozoites of *Balantidium coli* disappeared after the second day of treatment."

RIZZOTTI, G. Caso di isosporosi umana osservato in Addis-Abeba. [**A Case of Human *Isospora* Infection in Addis Ababa**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1952, July, v. 33, No. 7, 408–17. English summary.

This is claimed to be the first case of this disease recorded from Ethiopia. The patient was an Italian aged 46. No cause other than the infection with *Isospora* could be detected to account for the signs and symptoms which disappeared with the disappearance of the parasite from the stools. When found the parasite was in the oöcyst form. After being kept in a Petri dish at room temperature, some of the oöcysts showed 2 sporoblasts or 2 sporocysts at the end of 24–48 hours, and 2 mature sporocysts with 4 sporozoites in each at the end of 72 hours.

The disease had an initial stage of 7–8 days with some afternoon temperature and general malaise followed by diarrhoea which lasted 32 days.

Various sulphonamides were tried as treatment but recovery appeared to be spontaneous.

The clinical, including laboratory, findings are given in some detail.

J. Cauchi

RELAPSING FEVER AND OTHER SPIROCHAETOSES

LEVADITI, C., VAISMAN, A. & HAMELIN, A. Les *Borrelia duttoni*, devenus resistants aux anticorps spirillicides, se révèlent-ils réfractaires aux immobilisines de Nelson et Mayer ? [**Are the Forms of *Spirochaeta duttoni* which are resistant to Spirillicidal Antibodies also Resistant to the Immobilizing Antibodies of Nelson and Mayer ?**] *Ann. Inst. Pasteur.* 1952, Oct., v. 83, No. 4, 437–42. [12 refs.]

In this study the authors made use of tests elaborated by NELSON and MAYER to demonstrate the presence in syphilitic sera of a specific antibody which destroys the mobility of *Treponema pallidum* [*Bulletin of Hygiene*, 1949, v. 24, 646]. Rats were used in the first series of experiments. Spirochaetes, obtained from the blood soon after the peak of the first attack, were found to be 100 per cent. sensitive to the immobilizing antibody, but spirochaetes obtained after the first relapse were completely unaffected. By the 32nd day after infection no spirochaetes were present in the blood, but organisms from the spleen and brain were all fully resistant.

In the second series of experiments, blood, spleen, or brain, taken from mice 33, 118, and 276 days after infection, were injected into clean mice. The spirochaetes were tested as soon as the infection showed, and, in every instance, they were fully resistant.

When the resistant rat strain was passaged serially in mice, the resistance remained complete for 3 passages. By the 5th passage some 50 per cent. of the spirochaetes had become susceptible, and no resistant individuals remained by the 7th passage. Similar results were obtained with the mouse strains, but only a few passages were made.

The authors suggest that the secondary and tertiary manifestations of syphilis may be caused by resistant forms of *T. pallidum*, which have been slowly produced in the tissues.

J. C. Broom

Heisch, R. B. **First Record of** *Ornithodoros erraticus* **(Lucas) from Uganda, with some Speculations on the Origin of** *Spirochaeta duttoni* **Novy and Knapp.** *East African Med. J.* 1952, Nov., v. 29, No. 11, 477–9, 1 fig. & 1 map. on pl.

The report of the discovery of *Ornithodorus erraticus* in the Karamoja District of Uganda, where they were found in a burrow, partially opened by a ratel or other digging mammal. Four specimens were found, all belonging to the "small" variety of *O. erraticus*.

In Kenya this species occurs in burrows of pygmy gerbils (*Dipodillus* sp.) and is commonly infected with a spirochaete (*S. dipodilli*) [this *Bulletin*, 1951, v. 48, 157] ; it is often adjacent to large burrows usually occupied by porcupines and containing *Ornithodorus moubata*. It is suggested that in this way the infection in the gerbils might reach the *O. moubata* and acquire a new pathogenicity and become capable of infecting man. Although *O. erraticus* has yet only been found within or near the Rift Valley it is probable that the tick has a much wider distribution. *E. Hindle*

Davis, G. E. **The Relapsing Fevers : Tick-Spirochete Specificity Studies.** *Exper. Parasit.* New York. 1952, Nov., v. 1, No. 4, 406–10.

The author has tested the transmission of spirochaetes native to each, of 3 pairs of ticks, each pair found in the same habitat and presumably feeding on the same host. The first pair consisted of *Ornithodorus turicata*, the progeny of a strain from New Mexico, and *O. talaje* from Guatemala. Ten of each were fed on a mouse infected with *O. turicata* spirochaetes. At the next nymphal stage all the *O. turicata* were found to be infected with spirochaetes but none of the *O. talaje*. After 3 additional feedings on infected mice the *O. talaje* still failed to show any signs of infection.

The second pair consisted of *O. rudis* and *O. talaje* fed on a mouse infected with *O. talaje* spirochaetes. After 2 feedings 50 per cent. of the *O. talaje* became infected but none of the *O. rudis*, even after a third feed. However, after an interval of 79 days the injection of the triturated *O. rudis* into 2 mice produced spirochaetal infections.

The third pair comprised *O. erraticus* and *O. normandi* fed on a mouse infected with *O. erraticus* spirochaetes. After 4 feedings all the *O. erraticus* became infected but none of the *O. normandi*. These results indicate that the American relapsing fevers show the same degree of tick-spirochaete specificity as that reported from the Western Hemisphere. *E. Hindle*

YAWS

Rein, C. R. **Diagnostic Aids in Mass Treatment Campaigns against Yaws.** *J. Indian Med. Ass.* 1952, Nov., v. 22, No. 2, 67–71.

This paper was read at the WHO International Symposium on Yaws Control at Bangkok in March, 1952. The author discusses the part that might be played by serological tests in mass campaigns and especially in preliminary trial or pilot studies upon the findings of which the planning of the larger campaign should be based. Serological examinations may be most useful in diagnosis in areas of low yaws incidence. He stresses the need for a simple, inexpensive and consistent test.

The author discusses the questions of false negative reactions, false positive reactions and sero-resistance. It is his "experience that there is no appreciable

difference in the darkfield disappearance time following penicillin therapy of syphilis, yaws and pinta". "The disappearance time is more rapid following penicillin than it is following aureomycin, chloromycetin, terramycin and dihydrostreptomycin." "Quantitative serologic tests are mandatory in the pilot group in order to note the serologic trend following therapy." These should be carried out before treatment is started and at 3-month intervals for one year—at least after 6 months and one year. In a public health programme using a therapeutic course known to be effective, "essential information may be gained from the regular use of one qualitative and one quantitative test performed preferably with a cardiolipin-lecithin antigen". The longer the infection has been present and the higher the serological titre the more treatment is required.

"The serologic response in early yaws is certainly much slower than that observed in early syphilis with similar schedules of therapy" but this may be due to the earlier commencement of treatment in the latter. The paper ends with a number of questions for which answers are needed. *C. J. Hackett*

PINTO, A. R. & RONCON, R. O tratamento das boubas com o Stovarsol. [**Stovarsol in the Treatment of Yaws**] Reprinted from *Bol. Cultural Guiné Portuguesa.* 1952, Apr., No. 26, 249–54, 8 figs. on 4 pls.

The authors quote HACKETT [but the reference is not given] as saying in 1949 that there were probably some 10 million persons infected with yaws. Criteria for a satisfactory treatment comprise a drug easy to administer, not giving rise to toxic symptoms, of low cost, and producing a high percentage of cures after a short course. They maintain that stovarsol fulfils these criteria and record their results with 82 patients in Portuguese Guinea, their ages ranging from 1 to 54 years, 41 children, 32 adolescents and 9 adults, 42 males, 40 females. The scheme of treatment was to give a dose daily for 3 days, then 2 doses on alternate days, the dosage varying according to age as shown in the following table [there are 2 slips in the table as printed, but here corrected].

Age	Days of treatment							Total dose
	1	2	3	4	5	6	7	
	gm.	gm.	gm.		gm.		gm.	gm.
1–4 years ...	0·25	0·50	0·50	—	0·25	—	0·25	1·75
8–10 ,, ...	0·37	0·50	0·50	—	0·37	—	0·37	2·11
11–15 ,, ...	0·37	0·50	0·75	—	0·37	—	0·37	2·36
16–20 ,, ...	0·50	0·75	0·75	—	0·50	—	0·50	3·00
Over 20 ,, ...	0·50	0·75	1·00	—	0·50	—	0·50	3·25

Improvement in the lesions was very prompt. In 24 hours the exudation was lessened; by the 3rd to 5th days the lesions were drying up; by the 6th and 7th they were crusting over and cicatrization beginning, and clinical cure was apparently complete by 10 days. The drug was given in compress form, or, to children who could not swallow these, as powder with sugar. Re-examination clinically and by the Kahn reaction was carried out a fortnight later and again in 1–2 months, 7–9 months, 13–15 months, and 29–31 months. No relapses occurred in the first fortnight, 4 in the 1–2 months, 3 in the 7–9 months and one

in the 13–15 months, 8 relapses in all. None of the patients suffered from any toxic symptoms. Although 90 per cent. of patients were clinically cured, over half still gave positive Kahn reactions. *H. Harold Scott*

McLeod, Charlotte P. & Magnuson, H. J., with the technical assistance of Dorothy C. Huffman. **Penicillin Treatment of Experimental Yaws in Rabbits with special reference to Criteria of Infection and Cure.** *Amer. J. Syph.* 1952, Nov., v. 36, No. 6, 545–51, 1 fig. [11 refs.]

Forty Dutch rabbits were infected by intratesticular inoculation with approximately 5 million *Treponema pertenue* of the YC strain. All animals developed dark-field-positive lesions in the inoculated testes in 21–30 days. Five months after inoculation active lesions were still present in 27 rabbits and in 13 the infection was latent. The 40 rabbits were divided into 4 equal groups by random distribution. Treatment was with procaine penicillin G suspended with 2 per cent. (W/V) aluminium monostearate diluted with arachis oil to obtain the desired doses. The animals in the 4 groups were given total individual doses of 500, 2,000, 8,000 and 32,000 units per kgm. body weight in 4 equal daily intramuscular injections. Within 2 weeks lesions in all rabbits, except one on the smallest dosage, had subsided. Five months later emulsified lymph node transfers were made from each animal into the testes of two normal rabbits. By weekly examinations 32 of 68 animals were found positive by dark field examination of fluid aspirated from the testes after 42–92, average 64, days. In 11 of 22 positive transfers only one of the two recipient rabbits was found infected. Two and a half months after the lymph node inoculation, testicular fluid was transferred to normal rabbits and a month later the lymph node inoculation rabbits were killed and further testicular and lymph node suspension inoculations were made. These demonstrated that 15 rabbits thought not to have been infected were infected.

The 50 per cent. curative dose (CD_{50}) of procaine penicillin was approximately 7,500 units per kgm. body weight, based on lymph node transfers alone, but rose to approximately 16,000 units per kgm. when the further subinoculations were made (0·96 mega units per 60 kgm.). Lymph node transfer was an unreliable method for detecting latent yaws infection in treated yaws rabbits. Similar transfers from untreated yaws animals were also irregular and unsatisfactory.

[No mention is made of the time the YC strain has been away from man.] *C. J. Hackett*

LEPROSY

Lendrum, F. C. **The Name "Leprosy".** *Amer. J. Trop. Med. & Hyg.* 1952, Nov., v. 1, No. 6, 999–1008, 1 pl.

It is contended that the disease known as Zaraath in the Old Testament of the Bible, and as Lepra in the New Testament, both of which are translated as "Leprosy" in the English translations, is not Hansen's disease, but includes a number of other diseases, many of which either do not exist nowadays, or at least are unrecognizable from the descriptions given. The statement which is often made that leprosy is described in the Ebers Papyrus in 1500, is questioned as being only founded on conjecture. Notice is taken of the statement that during the 15th Century leprosy underwent a remarkable diminution and practically disappeared from the civilized parts of Europe, and that this diminution

was coincident with the great extension of syphilis. " In view of the difficulty of diagnosing skin eruptions even at the present day, we have scant justification for asserting that there was a change in the *frequency of a disease* in the Middle Ages simply because there was a change in the *frequency of a diagnosis* ". " Syphilis " afforded a convenient way of explaining any skin eruption without making the patient an outcast. *Ernest Muir*

SEN, P. **A Review on Classification of Leprosy.** *Leprosy in India.* 1952, Oct., v. 24, No. 4, 188–203.

This review stretches from the ancient Indian system right down through all the international and sectional conferences and congresses that have been held to the Havana Congress in 1948. It then comments on various views which have been expressed since the Havana Congress. From its nature it is impossible to abstract this review satisfactorily. After mentioning the 6 criteria for classifying leprosy the author concludes : " Whatever criteria, singly or in combination, are used in devising a system of classification of leprosy, it is extremely important that the various forms of the disease are so fitted into a system which will express, as far as possible, their biological relationship in a recognizable sequence. It is also very important to consider the availability of proper facilities for implementation of the system devised. As for the nomenclature it is of secondary importance, but some suitable word expressive of the peculiar pattern of the disease and generally acceptable should be found out." *Ernest Muir*

MUKHERJEE, N. **Classification of Leprosy.** *Leprosy in India.* 1952, Oct., v. 24, No. 4, 183–7.

The disadvantages of past methods of classification of leprosy are discussed, and the following primary classes are suggested : *leproma* (including macular, infiltrative, diffuse, nodular and polyneuritic) ; *lepride* (including major, minor and polyneuritic) ; *indeterminate* (including undifferentiated, borderline, residual and polyneuritic) ; *anaesthetic* (including polyneuritic, and areas or patches of local anaesthena). The last group includes any that cannot be fitted into one of the other groups. *Ernest Muir*

DHARMENDRA & MUKHERJEE, N. **A Simple Method of Concentration of Leprosy Bacilli from " Closed " Cases of Leprosy.** *Leprosy in India.* 1952, Oct., v. 24, No. 4, 169–77, 1 text fig. & 5 figs. on 2 pls.

This method is a simplication of that described by KHANOLKAR and RAJALAKSHMI [see this *Bulletin*, 1952, v. 49, 1048] and is on the same principle as that used by DHARMENDRA in concentrating and purifying lepromin antigen [*ibid.*, 1942, v. 39, 228]. A small piece of affected skin is excised, washed, minced fine and ground up with chloroform in a hard glass test tube, containing fine glass powder, by means of a glass rod with a bulb at the end. Due precautions are taken to prevent contamination. The bacilli, freed from the tissues, rise to the top, while the débris falls to the bottom of the test tube. The top layer is pipetted off drop by drop and allowed to dry on slides. The slides are fixed in Carnoy's fluid (absolute alcohol 60 cc., chloroform 30 cc., glacial acetic acid 10 cc.), washed and stained by a modified Ziehl Neelsen method which is described. The whole process from start to finish takes about 2 hours. It is illustrated with a diagram and 5 figures. The method was tried in 53 neuromacular cases that had given negative results by the routine method of examination. In 51 out of the 53 cases bacilli were found, in 7 of them in fair numbers.

In one of the 2 that were negative insufficient material had been taken. In 6 control subjects, not suffering from leprosy, no bacilli were found.

Ernest Muir

PORTNOY, J., GALVEZ, R. & CUTLER, J. C. **Clinical and Serologic Studies with reference to Syphilis in Guatemala, Central America. III. Studies of Comparative Performance of the Kahn, Kolmer, Mazzini, and VDRL Slide Tests among Leprosy Patients.** *Amer. J. Syph.* 1952, Nov., v. 36, No. 6, 566–70. [10 refs.]

This study concerns the results of various serum tests for syphilis in 51 leprous patients ; these tests included Kahn standard, Kolmer with lipoidal and cardiolipin antigens, VDRL slide test (cardiolipin) and Mazzini flocculation test. The numbers in each category are too small for percentages to be of any value but the numbers of positive or doubtful reactions with the respective tests were 28, 10, 13, 20 and 30. [According to the table of results only 44 tests with Kolmer lipoidal antigen and 42 with cardiolipin antigen were carried out.]

It is seen that the Mazzini test gave 58·8, the Kahn 54·9, the VDRL 39·2, Kolmer (cardiolipin) 30·9 and Kolmer (lipoidal) 22·7 per cent. of reactions. The cutaneous form of leprosy showed the highest level of reactivity and the neural the lowest with the podalic [this *Bulletin*, 1938, v. 35, 549] coming in between.

T. E. Osmond

GERNEZ-RIEUX, C., MONTESTRUC, E. & TACQUET, A. Les réactions d'hémagglutination et d'hémolyse conditionnée dans les différentes formes de la lèpre. (Leur intérêt dans le diagnostic, la classification et le pronostic.) **[Haemagglutination and "Conditioned Haemolysis" Reactions in the Different Forms of Leprosy. Their Part in Diagnosis, Classification and Prognosis]** *Arch. Inst. Pasteur de la Martinique.* 1952, July–Oct., v. 5, Nos. 3/4, 3–14. [21 refs.]

In making the tests two antigens were used : tuberculin IP48, and a fraction of that tuberculin. The sera used were 41 from lepromatous cases and 21 from tuberculoid and indeterminate cases. With the former there was 97·2 to 97·5 per cent. of haemagglutination, and 92·2 to 94·2 per cent. of conditioned haemolysis, while with the latter there was only 57·1 to 61·5 per cent. of haemagglutination, and 42·8 to 46·2 per cent. of conditioned haemolysis.

The differences between the results in these two sets of cases are so clear and consistent that it is considered that this method may be of use both in the classification and in the prognosis of leprosy. [See also this *Bulletin*, 1953, v. 50, 33.]

Ernest Muir

ARCURI, F. & FERRINI, O. Jodoprotidemia nella lebbra. **[Iodoprotein Blood Levels in Leprosy]** *Acta Med. Italica.* 1952, Oct., v. 7, No. 10, 253–5. [25 refs.] English summary (5 lines).

The authors, from the University of Genoa, determined the level of iodo protein in 30 cases of leprosy. The patients were aged 15–76 years and about half suffered from the lepromatous form. The levels found were from 2 to 6·6 *gamma* per cent., with an average of 4·1 : this is below the normal average of 5·2 gamma per cent. quoted by a number of other workers. The results are related to the clinical and pathological changes in leprosy from which the authors conclude that a state of hypothyroidism occurs in this disease.

H. J. O'D. Burke-Gaffney

Colorado Iris, R. & Leyva, R. D. Estimación de los niveles sanguíneos de *p-p'*diamino-difenil-sulfona (Sulfona) en enfermos de lepra. [**Estimation of the Blood-Levels of p-p'Diaminodiphenyl Sulphone (DDS) in Leprous Patients**] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1951, Jan.–Dec., v. 12, Nos. 1/4, 29–33, 2 graphs. English summary (8 lines).

The method of estimation is similar to that used by other workers, and the results also are very similar. With a dosage of 100 mgm. per day the blood concentration averaged 0·31 mgm. per 100 cc., with 200 mgm. per day it averaged about 0·48 mgm., and with 300 mgm. per day it averaged 0·67 mgm. per 100 cc. There was, however, a considerable diurnal variation in the concentration.

Ernest Muir

Touzin, R. & Merland, R. Elimination de la " Sulfone Mère " par le lait de femme. Conduite à tenir vis-à-vis de l'enfant issu de lépreux. [**The Elimination of " Parent Sulphone " in the Milk of Women. Method to Adopt with Children born of Leprous Patients**] *Méd. Trop.* Marseilles. 1952, Sept.–Oct., v. 12, No. 5, 536–41.

The authors quote 40 to 50 per cent. of infection with leprosy among children who are not separated from their leprous parents. At a leprosarium in the Province of Tananarive (Madagascar) 7 contracted the disease out of 160 newborn children isolated from parents during a period of 18 years. The number of births is, however, increasing, and to prevent overcrowding other arrangements had to be considered.

Nine mothers with the lepromatous form of leprosy and 7 with the tuberculoid form, who had very much improved on 200 mgm. of DDS per day, were accordingly allowed to keep their infants and nurse them. On examining in six of these patients the concentration of DDS in the blood and in the milk, it was found that in the latter it was on an average about 45 per cent. of that in the former. It was considered that this concentration would not be sufficient to prevent the children from contracting leprosy from their mothers : but so far, the children show no signs of the disease. *Ernest Muir*

Floch, H., Lecuiller, A. & Sureau, P. Sur le traitement sulfoné de la lèpre. Devenir de la phénylpropyldiaminodiphénylsulfone (sulfone disubstituée) administrée *per os* dans l'organisme. Mode d'action. [**What Becomes of Phenylpropyldiaminodiphenyl Sulphone (Disubstituted Sulphone) in the Body when Administered by Mouth**] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 5, 583–7.

This substance, commonly known by the proprietary names of Cimédone in France, and Sulphetrone in England, was studied to find out the amount absorbed when given by the mouth, and what changes took place in its chemical composition in the body. It was found that the absorption was at first 50 per cent., but on continued administration rose to 65 or 70 per cent. In the blood the Cimédone was found changed either entirely or to the extent of 75 per cent. into DDS, but in the urine (as when DDS is given by mouth) only part of the sulphone was in the form of DDS. It was found that by giving 3 gm. of Cimédone by mouth there was the same level of sulphone in the blood as by giving 200 mgm. of DDS per day. *Ernest Muir*

Erratum

Dr. de Souza-Araujo has pointed out certain errors which have appeared in the abstract of his paper entitled " Case of Acute Malignant Leprosy, with Infection

of the Consort within Three Months of Matrimonial Life. Isolation from a Cutaneous Lesion of the same Patient of an Acid-Alcohol Fast Bacillus (Chromogenic Culture) Pathogenic for Rats, Mice, *Macacus rhesus* and Man ", appearing in this *Bulletin*, 1951, v. 48, p. 647.

The following corrections should therefore be made : On line 1, the words " three months' history " should read " three to four years' history ". On line 3 of para 2, the words " showed blue-coloured bacilli mixed with ' roundish groups of acid-alcohol-fast bacilli looking like globias ' " should read " showed acid-fast bacilli only ".

HELMINTHIASIS

GADGIL, R. K. & SHAH, S. N. **Human Schistosomiasis in India. Discovery of an Endemic Focus in the Bombay State.** *Indian J. Med. Sci.* 1952, Nov., v. 6, No. 11, 760–63. [16 refs.]

The authors, from the Pathology School, Grant Medical College, Bombay, discuss the literature on the possible epidemiology of schistosomiasis in India, quoting data on snails examined and authenticated cases of schistosome infection reported in that country. Readers of this *Bulletin* will be familiar with these earlier studies.

The present authors are concerned with a village, Gimbvi, in the Ratnagiri district of Bombay State. It is situated on hilly coastal ranges and one of two local rivulets runs through the village. Forty families of the population of 1,200 live near this stream and use it for bathing and washing and it is grossly polluted.

The authors found urinary schistosomiasis to be highly prevalent in these 40 families, some 250 persons being infected. Haematuria was the only major symptom and was most severe in the youngest patients, namely those between 4 and 10 years. Every sample of urine in patients (48) of this group contained blood and large numbers of ova. With increasing age, ova were more difficult to detect. Elderly persons were not found to be infected, but gave histories of past disease. From the villagers' account, the disease has been endemic for about 60 years, but causes little disability or discomfort.

The ova were uniformly terminal spined : they, and the miracidia, resembled those of *S. haematobium*.

Many snails were found on stones in the bed and on the banks of the river. Of 300 dissected, 8 (2·6 per cent.) were infected with cercariae indistinguishable from those of *S. haematobium*. The snails appeared to belong to one species, apparently as yet undescribed. They belonged to the *Ampullaridae*, and the gross morphology resembled that of *Turbinicola*. However, the snails differed in some details from *T. saxea*, which is found in the hilly streams of the western ghats of Khandala and Igatpuri. Measurements are given and further studies are in progress.

It appears that there is in this area a snail capable of harbouring the cercariae of human urinary schistosomiasis, and it is suggested that detailed snail surveys in areas where isolated cases have been reported might be revealing.

While neither an endemic focus of schistosomiasis nor an intermediate host has been discovered definitely in India hitherto, it is the authors' opinion that " the evidence of the existence of human schistosomiasis in this country afforded by our work is certainly more than presumptive ".

H. J. O'D. Burke-Gaffney

VESELL, H. & SCHACK, J. A. **Schistosomal Heart Disease : Bilharzic Cor Pulmonale.** *Amer. Heart J.* 1952, Aug., v. 44, No. 2, 296–305, 4 figs. [19 refs.]

"A case of schistosomal heart disease, bilharzic cor pulmonale, is described. A presumptive diagnosis first was made on the history of adequate exposure to the cercariae, the development of hematuria within a year thereafter, and its persistence for eight years, without other known cause, the presence of the characteristic though rare cor pulmonale with aneurysmal dilatation of the major pulmonary arteries seen in the angiocardiogram, and the careful exclusion of other causes such as hemolytic disease and atrial septal defect.

"A definitive diagnosis was finally established by the finding of ova of *S. haematobium* in the urine. An angiocardiogram, electrokymogram, ballisto-cardiogram and twelve lead electrocardiograms of this condition are reported for the first time. This is the first case reported in which an ante-mortem diagnosis of bilharzial heart disease was made in this country. Schistosomiasis may be an important and unrecognized cause of cor pulmonale among those who have been in countries where this disease is prevalent."

PAYET, M. & CAMAIN, R. Pneumopathie aiguë à *S. haematobium*. [**Acute Pneumonic Changes in** *S. haematobium* **Infection**] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 5, 680–87, 9 figs. on 4 pls. [19 refs.]

After a useful review of the literature on pulmonary involvement in schistosomiasis the authors record the details of a case of this condition in an African seen by them at Dakar, W. Africa, due to *Schistosoma haematobium* infection. This man was gravely ill and died the day after his admission to hospital. On post-mortem examination gross changes were found in the pleura and lungs, and there were small abscesses in the lungs and the liver. Bronchopneumonic foci were found around a medium-sized interlobular artery in which lay a dead embolized adult worm ; and pseudo-miliary tubercles containing eggs were found elsewhere in the lungs around small arteries and capillaries where they had lodged after embolism. Eggs also were found in many pseudo-miliary tubercles in the liver. A staphylococcal septicaemia following the changes in the lung caused by the lodgment of the dead adult worms was considered to be the immediate cause of death. The lesions and the appearance of the eggs in them are shown in 8 photomicrographs. *A. R. D. Adams*

SIMÕES, A. O tratamento da schistosomíase vesical com a anthiomaline. [**Treatment of Urinary Schistosomiasis by Anthiomaline**] Reprinted from *Bol. Cultural Guiné Portuguesa*. 1952, Apr., No. 26, 265–8.

The author's patients were children apparently between 9 and 11 years of age and weighing 20 to 32 kgm. (two weighed more than this, namely 37 and 41 kgm.). All were passing ova of *S. haematobium* in large numbers ; 13 had enlarged spleens (possibly malarial) and all had a mild anaemia, Hb. 50–70 per cent. and eosinophilia from 7 to 59 per cent. ; 8 had microfilariae in their blood and 14 were passing hookworm ova. The anthiomaline used was a 6 per cent. solution containing 10 mgm. of antimony per cc.

The patients were divided into 2 groups : (1) Eighteen patients were given intragluteal injections of 2 cc. daily for 10 days, a total of 0·2 gm. of antimony, and were kept under observation for 145 days during which the urine was examined for ova. Among this group macroscopic haematuria was not seen 6 days after the treatment, normal ova were not seen after 11 days, nor miracidia after 15 days. After 3 months no normal ova were found, and after

5 months 11 only of the 18 could be examined ; 7 showed no ova, 4 showed degenerated ova. One had a return of the haematuria, but this cleared up later. (2) Twenty-one patients received 3 injections daily of 1·6 cc. at 3-hour intervals for 3 successive days, a total of 0·144 gm. antimony. Haematuria disappeared in a week and ova and miracidia after 19 days. Fifty days after the treatment ceased the 21 were again examined ; 11 were passing degenerated ova, the other 10 no ova at all. Four had a return of the haematuria and passed degenerated ova for a few days. Toxic symptoms mentioned were a slight fall in arterial tension (1mm.), 13 and 12 in the respective groups, headache in 6 and 9, pain at the site of injection in 1 and 16, and vomiting in 6 and 7 respectively.

The author concludes, therefore, that anthiomaline, though a valuable drug in urinary schistosomiasis, is not suitable for mass treatment.

H. Harold Scott

Molese, A. & Chieffi, G. Su di un caso di schistosomiasi trattato con il 2168 RP (Glucantim). [**A Case of Schistosomiasis Treated with Glucantime**] *Acta Med. Italica.* 1952, Oct., v. 7, No. 10, 271–3, 1 fig.

The English summary appended to the paper is as follows :—

"The authors report a case of intestinal and vesical schistosomiasis successfully treated with 2168 R.P. (Glucantim)."

Shakir, M. H. **A Spectrophotometric Method for the Assay of Sodium-Antimony III Bis-Pyrocatechin-Di-Sulphonate of Sodium [Fouadin].** *J. Roy. Egyptian Med. Ass.* 1952, v. 35, Nos. 11/12, 749–62, 6 figs.

Coutinho, J. O. Contribuição para o estudo da esquistossomose mansônica na República Dominicana. [**Contribution to the Study of Schistosomiasis mansoni in the Republic of Dominica**] *Folia Clin. et Biol.* S. Paulo. 1952, June, v. 18, No. 1, 57–73, 1 map & 6 figs. on 3 pls.

This is a record of investigations carried out in March and April, 1952, under the auspices of the Pan-American Health Department in Hato-Mayor and Las Palmillas in the province of El Seibo. The town of Hato-Mayor has a population of about 4,000 and the village of Las Palmillas some 300. They are watered by the Rio Maguá to the west and the streams Las Guamas and Paña Paña to the east. Ponce Pinedo had reported the existence of schistosomiasis mansoni there as long ago as 1942 and again in 1944 and 1948 in the *Puerto Rico J. Pub. Health and Trop. Med.* [see also this *Bulletin*, 1949, v. 46, 558]. In the present investigation the author used two methods of examination of faeces : that of Hoffman, Pons and Janer (enrichment by sedimentation in water) and that of Waller and Damin (enrichment by centrifugation in 15 per cent. HCl, ether and Triton NE) and the streams were examined for the molluscan hosts, *Australorbis* sp.

In Hato-Mayor 653 of the 4,000 inhabitants were examined (16·3 per cent.) and in Las Palmillas 65 (22 per cent.), 718 together. Particular attention was paid to those under 20 years of age and of 259 under the age of 10 years, 18 (15 males, 3 females) were positive (6·9 per cent.) ; of 236 between 10 and 20 years 52 (25 males, 27 females) were positive (22 per cent.). A proportion of 15 per cent. positive in Hato-Mayor would give about 600 for the town. Other helminthic infections were common, notably by *Ascaris lumbricoides*, ankylostomes, *Trichuris trichiura* and, much less, *Strongyloides stercoralis*. In fact, of the 718 examined only 43 (6 per cent.) were free from helminthic infection

other than schistosome. Of 295 under 10 years and of 236 in the second decade 9 only in each age-group were negative. A line map of Hato-Mayor shows the streets and the streams and the places where *Australorbis* was found. It is true that the number of these harbouring cercariae of *S. mansoni* were few ; 204 were collected, 153 were examined and 3 were found infected (2 per cent.).

Summing up the results of his study the author states that in the Hato-Mayor region there is, and has been for more than 10 years, an endemic focus of schistosomiasis mansoni ; that children and adults, male and female (particularly the former), are infected, and that infection is acquired by bathing in the waters, or by use of the water for domestic purposes, washing of clothes, etc. ; that, though found in all parts of the town infection is greatest in the areas watered by the Paña Paña and Las Guamas ; the snails also breed in collections of water remaining during the dry season ; that Planorbidae may be found as far as 10 kilometres from their initial focus, indicating a possible extension of the present endemic area. *H. Harold Scott*

Ferreira, J. M. & Meira, J. A. Três casos de esquistossomose mansoni procedentes do Interior do Estado de São Paulo (Ourinhos, Palmital e Ipauçu). Foco autóctone na cidade de Ourinhos. [**Three Cases of** *S. mansoni* **Infection from the Interior of the State of São Paulo, Brazil, Autochthonous Focus in the City of Ourinhos**] Reprinted from *Rev. Paulista de Med.* 1952, July, v. 41, No. 1, 15–18.

Ragab, M. M. **The Portal Circulation Time in Bilharzial Hepato-Lienal Fibrosis.** *J. Roy. Egyptian Med. Ass.* 1952, v. 35, No. 8, 533–44.

Dias, C. B. **A síndrome hépato-esplênica na esquistossomíase mansônica.** [Thesis.] [The Hepato-Splenic Syndrome in Schistosomiasis mansoni.]

This book is reviewed on page 365.

Ishii, N. & Ogawa, Y. **Studies on Schistosome Dermatitis " Kabure ", caused by the Cercariae of** *Schistosoma japonicum*. *Yokohama Med. Bull.* 1952, Apr., v. 3, No. 2, 57–71. [11 refs.]

" Kabure " is a name applied by the Japanese to a dermatitis occurring in persons living in areas where schistosomiasis is endemic. The authors submitted a short questionary to some 4,000 persons living in the Yamanashi area, where about 50 per cent. of the population are infected with *S. japonicum*. A statistical analysis of the answers suggested that primary exposure to schistosome cercariae caused no dermatitis, but that persons suffering from, or who had previously suffered from, *S. japonicum* infections, usually developed a typical reaction. In order to elucidate the nature of the reaction animal experiments were carried out on white rats and rabbits obtained from non-schistosome areas. The first exposure of these animals to schistosome cercariae caused no " kabure " dermatitis, and the second exposure, carried out shortly after the primary, also gave negative results. On the other hand, exposures to schistosome cercariae at intervals of more than 30 days between the primary and tertiary exposures, produced typical " kabure " dermatitis on the experimental animals, with symptoms of macules, papules accompanied by erythema and oedema, 24 hours and 48 hours after exposure.

It is concluded that " kabure " dermatitis is essentially an allergic phenomenon resulting from the presence of the worm or its products in the tissues. [Hunter *et al.*, this *Bulletin*, 1952, v. 49, 416, proposed to have " koganbyo " as a general term to be applied to schistosome dermatitis in Japan.] *R. M. Gordon*

MOZLEY, Alan [D.Sc., Ph.D., F.R.S.E.]. **Molluscicides.** pp. viii+87, 11 figs. 1952. London : H. K. Lewis & Co., Ltd., 136, Gower Street, W.C.1. [9s.]

The subject is introduced by an outline of the sphere of usefulness of molluscicides with special reference to schistosomiasis of man and animals and fascioliasis in animals. The author deprecates the idea of endeavouring to combine the functions of molluscicides and insecticides since the latter are usually very toxic and would be dangerous to use on snail habitats, which are often sources of water used for domestic purposes. General considerations in the application of molluscicides are discussed and the need for preliminary snail surveys and field trials is indicated. The relation between water vegetation, snail habitats and molluscicides is discussed at some length. In Chapter IV, 6 pages are given to the subject of molluscicides of vegetable origin and the value of sawdust and wood ash in snail control is mentioned. The next two chapters deal respectively with recent investigations on synthetic organic substances and inorganic compounds. Salts of iron, zinc, silver and calcium are discussed briefly but some detailed information is given about the results of laboratory trials with 8 different solutions (0·1 to 1·0 part per million) of the sulphate, nitrate, chloride and acetate salts of copper. In the author's opinion copper is the most effective molluscicide and the choice lies either with the sulphate or the carbonate in the form of malachite.

In Chapter VII the different methods of application are described. This should be read in conjunction with Appendix D, " How to treat a Pond " which gives details of dosage. The use of edible bait containing metaldehyde for destroying non-aquatic molluscs such as slugs and land snails which are injurious to crops [and some of which also act as vectors of helminths of domestic animals] is described in Chapter VIII.

The data concerning trials with various chemicals carried out by American workers are brought up to date and summarized briefly in an addendum.

Appendices A, B and C give accounts of the life-cycle of *Schistosoma* and *Fasciola ;* practical hints for finding snails and examining them for infection ; and a field experiment conducted by the author in Southern Rhodesia.

Although the author's views on the supremacy of copper will not find universal acceptance, those concerned with the subject of molluscicides and their application will find points of interest in this booklet.

J. J. C. Buckley

HUNTER, G. W., FREYTAG, R. E. & RITCHIE, L. S. **Potential Molluscacides screened in the Laboratory and the Results of Preliminary Field Plot Tests.** *J. Parasitology.* 1952, Dec., v. 38, No. 6, 509–16. [12 refs.]

" Nine of the best 137 organic compounds, or combinations of these, were tested in small field plots as potential molluscacides, but only four 90% 2,4,6-trichlorophenol (Dowcide 2-S), 75% sodium pentachlorophenate plus 13% sodium salts of other chlorophenols (Dowcide G), 2,4,5-trichlorophenol, sodium salt (Dowcide B), and copper pentachlorophenate were found to be effective.

" According to observations made 14 days after treatment none of the mixtures of Dowcide G with each of four insoluble chemicals in dispersed form were better than Dowcide G alone. However, a combination of Dowcide G with either 2,4,5-trichlorophenol or 2,4,6-trichlorophenol (Dowcide 2-S) killed snails more rapidly than when used alone.

" The results by a series of dilutions on each of several compounds indicate that the effectiveness of the chemicals probably was influenced by the nature of the plant-growth and amount of soil moisture in the different test plots.

These factors must be definitely considered in determining the best dosage of a molluscacide in a practical control program for *Oncomelania nosophora*."

OIKE, K., ASODA, Y. & SIRAKAWA, T. **Mass Chest Survey of Paragonimiasis (Part 2).** *Shikoku Acta Med.* 1951, Dec., v. 2, No. 6, 304. [Japanese version 304–6, 3 figs.]

The portable condenser type of X-ray apparatus used in an earlier survey [this *Bulletin*, 1953, v. 50, 131] was employed in a second survey in Ehime Prefecture, Japan, in August, 1951. The area surveyed consisted of 4 villages on the banks of the Shimanto river, a known endemic area of paragonimiasis. It was found that in a 6×6 cm. fluorogram, all the details required could be read.

Microscopic examinations of sputum for eggs and the intradermal test for paragonimiasis were also done and in the 4 villages, where a total of 135 investigations were made, 26 positive skin tests and 6 positive sputa were found.

X-ray results are given for the 26 cases in which the skin tests and " egg in sputum were positive " [a table shows only 6 egg-positive sputa]. Altogether, there were found 2 cases with cystic shadows, 6 with nodular shadows and 18 with infiltrative shadows. These are shown in 6 X-ray photographs, which are, however, somewhat faintly reproduced.

Three cases were complicated by tuberculosis, making the diagnosis difficult. The authors point out that the shadow of a tuberculous cavity if often very much larger than the small oval cystic shadow in paragonimiasis : also calcification is not seen in the latter condition. *H. J. O'D. Burke-Gaffney*

BIOCCA, E. & MASSI, O. Il problema della echinococcosi in Italia : indagini e considerazioni. [**The Problem of Hydatid Disease in Italy : Research and Observations**] *Riv. di Parassit.* Rome. 1952, July, v. 13, No. 3, 235–40. English summary.

Rome hospitals surgically treated over 1,000 cases of hydatid disease from 1941 to 1951 and it is feared that this helminthic infestation may be spreading.

Intermediate hosts.—The authors have carried out investigations at the public abattoir and found hydatid cysts in 56 per cent. of 841 adult sheep, 14·52 per cent. of 1,088 adult beef animals and 0·81 per cent. of 1,100 adult horses examined. Among the animals affected 76 per cent. of the sheep, 15·18 per cent. of the cattle beasts and nearly 78 per cent. of the horses had fertile hydatid cysts.

The authors also examined a large number of young animals—pigs, ovines, bovines and equines—but only the pigs, which were aged up to 12 months, gave any positive results ; among 6,640 pigs, 14 animals had cysts and in only one of these cases were fertile cysts demonstrated.

The animals came to the Rome abattoir from many parts of the country.

Definitive hosts.—The authors found echinococcus in 4 out of 100 dogs examined. The dog population in Rome is estimated at about 40,000. Also, 35 cats, 3 wild cats, 10 foxes and 10 badgers, all caught locally, were examined with negative results.

Measures recommended.—The sheep appear to be the main source and reservoir of the helminth and the thorough destruction of all infected organs at the slaughterhouse is necessary to reduce spread of infection to dog. More stray dogs should be seized and put away, and pet dogs should be regularly de-wormed. More public health education is needed on this subject.

J. Caucki

Bocchetti, G. & Begani, R. Contributo alla conoscenza delle variazioni siero-ematiche dopo intradermoreazione alla Casoni. [**A Contribution to the Knowledge of the Changes in the Blood Serum following the Intradermal Test of Casoni**] *Nuovi Ann. d'Igiene e Microbiol.* 1952, May–June, v. 3, No. 3, 234–44. [20 refs.] English summary (7 lines).

This paper refers to a study of complement-deviation (Ghedini-Weinberg reaction) and of the eosinophile count in relation to the intradermal injection of hydatid fluid (Casoni reaction). The investigations were carried out in a total of 50 subjects, in 25 of whom the presence of a hydatid cyst was confirmed by operation ; the other 25, selected as controls, were carefully examined to exclude hydatid cyst, urticaria, jaundice, asthma, dermatosis or other allergic conditions.

The Casoni test must not be repeated in the same individual, as the intradermal injection of hydatid fluid itself leads to sensitization.

The Casoni test was positive in 19 cases of hydatid cyst, and the complement-deviation test, when applied before the intradermal test, was found positive in 18 of the cases. Among the 7 (complement-deviation) negative cases, 3 became converted to positive within 6 to 24 hours after the intradermal test, the latter test having itself proved negative in one of these 3. In 4 other cases of hydatid cyst, the complement-deviation titre went up as a result of the intradermal injection of hydatid fluid.

Of the 25 hydatid subjects, 17 had an eosinophile count above 4–5, the remainder showing a count below this level. The intradermal reaction was followed by a progressive rise in the eosinophile count.

In the controls, the intradermal test proved negative and so did the complement-deviation test both before and after the intradermal test. The last produced some small rise of the number of eosinophiles in the controls.

The complement-deviation test is highly specific when positive, but it is often negative. A negative complement-deviation may be converted to positive and a weak positive may have its titre raised as a result of the intradermal injection of hydatid fluid and this may have a valuable application for purposes of diagnosis. *J. Cauchi*

Pellegrini, D. Aspetti attuali nella profilassi della idatidosi. [**Current Aspects of the Prophylaxis of Hydatid Disease**] *Ann. d. San. Pubblica.* Rome. 1952, July–Aug., v. 13, No. 4, 1083–94. English summary.

The main points of practical value are similar to those brought out by Biocca and Massi [above, 1953, p. 322].

See also p. 336, McFadzean & Wong, **Intravenous Iron in the Management of the Anaemia of Ancylostomiasis.**

Rogers, K. B. **The Difficulty caused by the Fragility of the Ova of** *Ascaris lumbricoides*. *J. Clin. Path.* 1952, Nov., v. 5, No. 4, 363–4, 3 figs.

The author reports that, in several preparations of a faecal emulsion from a patient known to harbour *Ascaris lumbricoides*, no eggs of this species were found. Seeking the reason, he found that an unconscious habit of squeezing air-bubbles out of the preparations by slight pressure with a pencil point on the cover glass had the effect of bursting the eggs of *A. lumbricoides* or completely altering their appearance. When the same emulsion was examined without a cover glass, typical eggs were found. Photographs show the normal eggs and eggs altered by very light or slightly greater pressure. The author found that all eggs of this species are equally fragile. *G. Lapage*

KAKIZAKI, C. **Clinical and Histo-Pathological Studies on the Change of the Liver in Bile Duct Ascariasis.** [Abstract.] *Hirosaki Med. J.* 1952, Sept. 30, v. 3, No. 2, *28. [Fuller paper in Japanese 116–26, 16 figs. (14 on 4 pls.) (20 refs.)]

While many cases have been reported of liver abscess due to *Ascaris lumbricoides* there does not seem to be much information about the local atrophic changes in the liver. In this English summary of Japanese work, the author, from Hirosaki University, records the histological findings on biopsies taken from 21 such cases out of a total of 68 cases of bile duct ascariasis operated upon in 7 years.

In 3 of the 21 there were abscesses, 3 showed disseminated atrophic areas, 14 had solitary atrophic areas and 1 showed broad scarring after a healed abscess. The left lobe alone was affected 11 times, the right 3 times and both lobes 7 times, so that these changes seem to be more frequent in the left lobe. They also occurred mostly in patients with histories of repeated severe abdominal pain over a long period, which suggested a "habitual" bile duct ascariasis. Histologically, the main finding was a localized cirrhosis caused by chronic cholangitis and pericholangitis. There was an accompanying local zone of eosinophiles, of varying extent.

The author reminds surgeons of the need to look out for these liver changes in ascariasis, for they may be met with not infrequently in bile duct operations on Japanese patients. *H. J. O'D. Burke-Gaffney*

BRYGOO, E. R. & AIGLE, G. Exemples de la périodicité nocturne de *Wuchereria bancrofti* au Sud-Vietnam. [**Examples of Nocturnal Periodicity in *W. bancrofti* in South Vietnam**] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 5, 614–16, 1 fig. Discussion 617 [GALLIARD, H.].

In testing the periodicity of microfilariae in Vietnamese males the authors employed the standard technique recommended by the International Conference on Filariasis of 1951, in which 20 cmm. of blood is taken every two hours, and 3 preparations are made on each occasion. The thick drops after dehaemoglobinization were stained with Giemsa. Observations were made over a period of 36 hours.

In 3 of 4 subjects examined microfilariae were strictly nocturnal and in heavy concentration : in one as many as 567 were found in the 3 preparations. The nocturnal curves obtained in each were roughly similar, reaching the fastigium just after midnight. As others have experienced, great variations in numbers were found in the 3 preparations of measured blood taken at the same time : the explanation of this anomaly is not apparent.

Philip Manson-Bahr

DEJOU, L. Les lésions lymphatiques en rapport avec le syndrome éléphantiasique, lymphangiectasies, lymphangites à rechutes, lésions lymphatico-veineuses. [**Lymphatic Lesions Associated with the Elephantoid Syndrome**] *Méd. Trop.* Marseilles. 1952, July-Aug., v. 12, No. 4, 440–49. [12 refs.]

Affections of the lymphatic vessels and associated glands are the most constant changes found in the elephantoid syndrome, and characterize its three principal groups.

(*a*) Lymphangiectases, due to *W. bancrofti*, present the type of parasitic infection of the deep abdominal lymphatics and of the thoracic duct. The pathological effects are due to their centrally placed position which discloses itself, for example, by the production of bilateral inguinal varicosities.

Filarial lymphangiectases differ fundamentally from those of non-filarial origin, but the underlying mechanism of *elephantiasis nostras* still remains a mystery. Certain it is that it has proved impossible to reproduce lymphatic varices by ligature of the lymphatic trunks or by resection of the lymphatic glands. The physio-pathological character of lymphangiectases of filarial origin is quite peculiar.

(*b*) Lymphangiectasis may precede elephantiasis, but the sequence of this mechanism is far from being invariable. In this condition the glands are in some situations fibrous and the vessels themselves sometimes dilated : in others they are sclerosed and obliterated.

(*c*) The third type, which is rare, is due to the association of venous thrombosis with lymphatic obstruction. This type can be cured by operation, but the exact procedure performed varies according to the tightness of the crural ring and the obstruction to the femoral vein by pressure of the surrounding hypertrophied aponeurosis in the ring itself and in the vascular sheath or by veno-thrombosis. Ligature of the vessel, together with stripping of the crural ring, gives immediate relief. On the other hand the niceties of the situation are so balanced, as the result of phlebitis and the superadded lymphangitis, that the surgeon has to use his discretion as to the amount of elephantoid tissue to be removed. *Philip Manson-Bahr*

Jonchere, H. & Pfister, R. Enquête sur la répartition de l'onchocercose en A.O.F. [**Study of the Distribution of Onchocerciasis in French West Africa**] *Bull. Méd. de l'Afrique Occidentale Française*. 1952, v. 9, No. 1, 5–12.

The authors' summary in French is translated freely as follows :—

Of the 17 million people living in French West Africa, 200,000 are infected with *Onchocerca volvulus*. Most of these are not much affected by it, but among these, 20,000 have more or less serious ocular complications and 4 to 5 thousand are blind on account of onchocerciasis. The regions most affected are the northern parts of Guinea, and Dahomey, the southern part of Sudan and the Upper Volta, that is to say, the territory enclosed by the 10th and 12th parallels. The control of onchocerciasis, by treatment in the whole of the territory would require a very large sum of money—several hundred million francs, and it is recommended therefore that for the present, treatment should be confined to those whose eyes are affected. *J. J. C. Buckley*

Pfister, R. Répartition et fréquence des filarioses en Haute-Volta et en particulier dans la région de Bobo-Dioulasso. [**Distribution and Frequency of Filariasis in Haute-Volta, particularly round Bobo-Dioulasso**] *Bull. Méd. de l'Afrique Occidentale Française*. 1952, v. 9, No. 1, 13–27.

This paper has also appeared elsewhere [see this *Bulletin*, 1952, v. 49, 1065].

See also p. 340, Sarkies, **Onchocerciasis and Trachoma in the Gold Coast.**

Martinez Baez, M. & Tello de la Peña, R. Modificaciones en la eosinofilia de los oncocercosos consecutivas a la administración de Hetrazán. [**The Effects of Hetrazan on Eosinophilia in Onchocerciasis**] *Medicina*. Mexico. 1952, Nov. 10, v. 32, No. 663, 497–9.

Onchocerca and *Trichinella* infections are forms of helminthiasis which give rise to the highest degrees of eosinophilia and this is ascribed to the fact that the embryos and larvae of these come into intimate contact with the fixed tissues of the host. Administration of hetrazan in onchocerciasis is followed by a rapid fall in eosinophiles and death and disappearance of the microfilariae

from the skin. This eosinophilia, however, soon afterwards reappears to reach as high a level as, perhaps even higher than, at first. The authors offer an explanation of this. Counts of eosinophiles were made by several medical men in patients infected with *O. volvulus*, before and after treatment by hetrazan. Sixty-nine cases in all are referred to ; in some a single count was made before and after, in others counts at regular intervals, in others daily. All confirmed the rapid early fall, but in varying degrees, 30 per cent. to 6 per cent. in one series, 28·8 to 14·4 in another. Within a fortnight the eosinophilia returned, in the former up to 50 per cent.

The explanation offered by the authors is this : the hetrazan causes rapid death of a large number of microfilariae and the result is intense allergic shock among the manifestations of which is the fixation of large numbers of eosinophiles around the bodies of the dead embryos. The bone-marrow then produces more eosinophiles in large quanties which appear in the blood stream, so that this secondary rise is due, primarily, to the action of the hetrazan on the embryos. [Is this an explanation or merely a theory or suggestion ?]

H. Harold Scott

Nettel F., R. Oncocercosis. Revisión del problema entomológico de la oncocercosis y plan para la erradicación de *Simulium ochraceum* Walker. VI & VII. [**Onchocerciasis. Review of its Entomology and Plan for Eradication of** *Simulium ochraceum*] *Medicina.* Mexico. 1952, Oct. 25, v. 32, No. 662, 482–93, 7 figs.

In the 6th section of this study the author writes of the earlier campaigns undertaken to deal with Simuliidae and of the advantages of more recent methods. He treats of this part of his subject under 6 heads : i. Natural infection of eggs, larvae and pupae by microsporidia, and insects preying upon them ; ii. Those preying on adult forms ; iii. Removal of vegetation (*desyerbar*) along the borders of streams and the use of chemicals to destroy the larvae, such as oils, lysol, carbon bisulphide, pyrethrins, in the period 1932–35 ; iv. Larvicides of more recent introduction such as creolin (1 : 1000), DDT which has been found successful, says the author, in Guatemala in a strength of 1 part in 7½ million of water, but he himself maintains that 5–10 parts per million, applied for an hour, is better and on the whole more economical. Gammexane in a strength of 1-5 parts per million is serviceable. These 3 larvicides are recommended as the results of experiments in foci of the infection, but the experiments are to be repeated for confirmation. v. Other antilarval measures, such as the formation of dams in the streams for 6 hours, during which time the bed will dry up and the larvae die and, when the dam is removed, the rush of water will carry away the dead larvae. vi. The use of insecticides (as under iv), protection of dwellings by covering doors and windows with fine-meshed metal gauze, personal protection by repellents and proper clothing.

Section VII is concerned with the method of applying larvicides to streams, as by suspending bags containing the calculated amount of chemical at the source of the stream, and with controlling and reporting the results to the authorities concerned.

H. Harold Scott

Nettel F., R. Oncocercosis. Revisión del problema entomológico de la oncocercosis y plan para la erradicación de *Simulium ochraceum* Walker. VIII. [**Onchocerciasis. Review of its Entomology and Plan for Eradication of** *Simulium ochraceum*] *Medicina.* Mexico. 1952, Nov. 10, v. 32, No. 663, 499–508. [103 refs.]

This appears to be the final section of the author's contribution to the investigation and in it he sums up the information imparted in or to be deduced

from the 7 previous sections [see this *Bulletin*, 1953, v. 50, 135, 234]. He details his plan of campaign under three fundamental heads : i. *Technical considerations* : choice of larvicide and the mode of its use ; training of staff and control of the results obtained from treatment of the water collections, laboratory studies, preparation of maps, sketches, photographs, and arrangements for statistical inferences. ii. *Administrative considerations*. These will differ according to the district ; details of staff are suggested for the States of Chiapas and Oaxaca and for a central head office to which all reports and records can be sent. iii. *Economic considerations*, entering into details of the cost of the campaign. The article ends with a list of over 100 references.

H. Harold Scott

Young, M. D. & Hayne, I. **Gongylonema Infection in South Carolina. Report of a Case.** *J. Amer. Med. Ass.* 1953, Jan. 3, v. 151, No. 1, 40.

An immature specimen of a *Gongylonema* (probably *G. pulchrum*) was removed from the mucosa of the lower lip of a Negro woman in South Carolina. The worm had migrated from the centre of the upper lip about half the length of the right cheek and back to the centre of the lower lip in 20 hours.

The source of the infection was obscure, but the most likely origin was contaminated well water. This appears to be the first human infection reported in South Carolina, the eighth from the United States and the seventeenth in the world literature [see this *Bulletin*, 1952, v. 49, 1145].

H. J. O'D. Burke-Gaffney

Ricci, M. Ricerche parassitologiche nell'isola d'Ischia. 2—Nuove ricerche con lo " Scotch Cellophane Tape " (metodo di Graham) sulla popolazione infantile. [**Parasitological Surveys in the Island of Ischia. 2. A New Survey of the Child Population by means of Graham's Method of " Scotch Cellophane Tape "**] *Riv. di Parassit.* Rome. 1952, July, v. 13, No. 3, 241–55. English summary.

This is a statistically treated account of a survey carried out in May–June 1952, which is the end of the scholastic year ; its findings are compared with their counterpart in a previous survey carried out 8 months earlier, and already published as a separate paper [this *Bulletin*, 1952, v. 49, 710]. The first survey covered 5 of the 6 districts of the island, involved 721 children aged 1–12 years and showed an *Enterobius* infestation rate of 30·65 per cent. The rate was higher for female children and lowest for those under 5 years of age. The rate varied with the district and the second survey was confined to the 3 districts which had shown the highest rates in the first survey.

In the second survey, 777 children, of whom 476 were male, were examined, and they showed an *Enterobius* infestation rate of 46·46 per cent.

Each child was examined once only.

From a comparison of the 2 surveys the author concludes that (1) there has been an increase in the incidence of infection after 8 months which correspond to a school year ; (2) this increase was more or less uniform for the 3 districts surveyed ; (3) male showed a more marked increase than female children ; (4) the increase was in the age-group 6–12 years. The author speculates on the possible relationship of various factors, operating during terms and school holidays, to these findings. The findings are analysed in detail in 11 tables.

J. Cauchi

WATSON, J. M. & MAC KEITH, R. **The Comparative Efficiency of Various Techniques for the Diagnosis of Threadworm Infection.** *Arch. Dis. in Childhood.* 1952, Dec., v. 27, No. 136, 526–32. [33 refs.]

The multiplicity of techniques for recovering the ova of threadworms from the perianal skin in diagnosis of threadworm infection, has given rise to confusion. The present paper, after a historical survey of the literature which deals with diagnostic methods, describes in some detail experiments which were made with the purpose of comparing the efficiency of 6 different methods. As infection of animals with *Enterobius vermicularis* is not possible, the rabbit threadworm *Passalurus ambiguus* was used as the source of the experimental material. The techniques were tested for their ability to recover eggs posited on the palm of the hand by gravid females and also from suspensions of eggs placed on the forearm.

The numerical results obtained are set out in tables and were analysed statistically, with the use of the indices (*a*) arithmetic mean, (*b*) coefficient of variation, and (*c*) the percentage of tests in which less than 10 ova were recovered, to judge the reliability of the methods. The 6 methods so tested were : (1) N.I.H. swab, (2) T.P. (toilet paper) swab, (3) adhesive Cellophane swab, (4) glass pestle, (5) direct slide, and (6) camel hair brush. The experiments showed that there was little to choose between adhesive Cellophane N.I.H. swab, direct slide, and brush, when reliability was tested with eggs that have not been wetted. When wetting has taken place, however, the adhesive Cellophane and the glass pestle are the most reliable. On balance, the adhesive Cellophane swab method is regarded as the method of choice and is the only one which fulfils all the requirements of a clinically satisfactory device. It should, however, be replaced by one of the other devices if the patient is an adult male with abundant perianal hair. When ointment has already been applied to the skin then the best method is the T.P. swab, which, after clearing (clearing methods are described), is examined with dark-ground illumination. [The T.P. swab was described (Watson and Mac Keith, *Proc. Roy. Soc. Med.*, 1947, v. 40, 539) as follows : " This device employs toilet paper in place of cellophane ; the paper being applied with the finger or using a glass rod as with the N.I.H. swab. The paper is rendered transparent by placing it, applied surface upwards, on a drop of clearing agent such as oil of wintergreen, another drop being added and the preparation covered with a coverglass. The eggs clear much more slowly than the paper and are readily visible against a translucent background."] *M. E. Delafield*

See also p. 341, CROLL and CROLL, **Ocular Manifestations of Trichinosis.**

DEFICIENCY DISEASES

PHILLIPS, P. G. & KENNEY, R. A. **Plasma-Urea Levels in West Africa.** [Correspondence.] *Lancet.* 1952, Dec. 20, 1230.

Urea estimations were made on the heparinized plasma of 10 West Africans and of 5 European controls at Lagos, Nigeria. The mean value for the Africans was 13·9 mgm. and for the Europeans 26·7 mgm. per 100 ml. The low values found for the Africans may be related to the economic status of the subject operating through the diet, since the lowest values observed were in 4 daily-paid labourers, and the higher values in members of the permanent staff of the Research Unit. *J. H. Birkinshaw*

JELLIFFE, D. B. **The Protein Content of the Breast Milk of African Women.** *Brit. Med. J.* 1952, Nov. 22, 1131–2, 1 diagram. [26 refs.]

Seventy-six specimens of breast milk from Nigerian mothers had an average protein content of 1·04 per cent. (range 0·59 to 1·76). Although most of these women were living on poor diets deficient in protein, this figure does not differ significantly from figures obtained for the milk of well-fed mothers in North America and Europe. In many cases lactation was prolonged, often up to 2 years and sometimes up to 3 years, but there was no evidence of any falling off in the protein content of the milk. *R. Passmore*

HILL, K. R., RHODES, Katerina, STAFFORD, J. L. & AUB, R. **Serous Hepatosis : a Pathogenesis of Hepatic Fibrosis in Jamaican Children. Preliminary Report.** *Brit. Med. J.* 1953, Jan. 17, 117–22, 1 text fig. & 13 figs. on pl. [46 refs.]

This paper is an extension of a previous report [see this *Bulletin*, 1952, v, 49, 437]. A liver disease common among Jamaican children is described. Histological studies of biopsy specimens of liver show that the first lesion is a serous exudation : this is followed by the deposition of an eosinophilic coagulum which is subsequently invaded by fibroblasts. Thus a fully developed hepatic fibrosis arises. The pathology differs from that found in the livers of African sufferers from kwashiorkor in that fat is very seldom seen and fatty degeneration of the liver cells does not precede the fibrotic changes.

As in kwashiorkor, the disease is closely associated with diets very low in animal proteins. Vitamin deficiencies, malaria and intestinal worms were present in only a minority of patients. It is possible that a toxic agent, in conjunction with the low dietary protein, may be the aetiological factor. Most of the children had consumed a variety of bush teas almost since birth, and it is suggested that these might contain a poison, which acts upon livers made unduly susceptible by protein deficiencies. *R. Passmore*

SPRUE

FRAZER, A. C. **Disordered Gastro-Intestinal Function and its relationship to Tropical Sprue, Coeliac Disease and Idiopathic Steatorrhoea.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1952, Nov., v. 46, No. 6, 576–85, 1 pl. [46 refs.] Discussion 585–99 with 27 further refs. [WOODRUFF, A. W. ; MAEGRAITH, B. G. ; BADENOCH, J. ; ROSENTHAL, F. D. ; STEWART, H. ; STANNUS, H. S. ; PAULLEY, J. W. ; FRAZER, A. C. (in reply) ; FAIRLEY, N. H. (President).]

Professor Frazer gave an account of studies carried out on cases of tropical sprue, coeliac disease and idiopathic steatorrhoea in which the gastro-intestinal functions of absorption, secretion and motility were examined.

In all three conditions there was demonstrated a depression and delay of both fat and glucose absorption. The results of absorption studies were detailed in the following table :—

	Tropical Sprue	Coeliac Disease	Idiopathic Steatorrhoea	Normal
Fat Balance (in %)	68 (38–80)	74 (50–85)	73 (56–86)	> 90
Chylomicrograph Peak (in particles per standard field)	75 (45–97)	59 (16–130)	50 (10–95)	>150
Blood Sugar Curve (oral) ... ... Peak (in mgm. per 100 ml. increment)	28 (10–50)	20 (0–34)		>40
(Intraduodenal) ...			25 (0–38)	65 (50–80)

Figure shown is the mean : the range is shown in brackets.

The non-specific nature of the absorptive defect was suggested by parallel delay and depression in the absorption of glucose and urea.

Examination of gastric secretion demonstrated that hypochlorhydria was common but not consistent. Intestinal intubation revealed that pancreatic enzymes were active within normal limits. Emulsification of fat was normal. Increased secretion of mucus in the small intestine was indicated by the demonstration of the so-called " deficiency pattern," which was observed with ordinary suspensions of barium sulphate, but not if non-flocculable suspensions were used. The use of non-flocculable barium suspensions revealed that in the sprue syndrome " the small intestine was dilated and atonic and lacked the feathery mucosal pattern of the normal intestine ". This picture was also seen in all cases of coeliac disease and idiopathic steatorrhoea investigated.

In an extremely interesting discussion the author concluded that functional incapacity of the small intestine was the basic pathological factor in sprue, coeliac disease and idiopathic steatorrhoea. The principal features of the clinical syndromes probably resulted from the effect of the delayed and depressed absorption, the modification of intestinal content, and possibly an increased growth of intestinal bacteria.

The primary aetiological factors were not clear. They did not include adrenal or other obvious endocrine insufficiency, primary vitamin deficiences or the direct effects of climatic conditions. Hereditary factors and infection might possibly have some causative rôle. In some cases of tropical sprue there was some evidence that rancid fats might be an important initiating factor. Dietary wheat gluten was a major factor in coeliac disease.

Many interesting points were raised in the discussion which followed Professor Frazer's paper. It was generally agreed that vitamin deficiences in sprue were essentially secondary. Professor Woodruff made the point that Caribbean sprue might not be " sprue " as defined in Britain, but basically a nutritional megaloblastic anaemia with alimentary symptoms. This would account much more readily for the severity of the anaemia and the fact that the patients' diets have been found to be deficient in folic acid. If this suggestion were correct it would imply that reports coming from the Caribbean concerning sprue, and particularly concerning the therapeutic effect of folic acid in sprue, could not be taken as being applicable to the disease as seen in India.

Professor Maegraith considered that the common delay in gastric emptying in sprue and the excessive intestinal secretion of mucus might be related to the same cause. Mepacrine and apomorphine could produce the same effects in normal subjects and in rats.

Dr. Badenoch referred to 26 patients suffering from idiopathic steatorrhoea who were examined in Oxford ; 7 were found to have histamine-fast achlorhydria ; in 12 the acid secretion was subnormal. Four of these patients received daily intramuscular injections of 100 mgm. cortisone for a month with disappointing results. The mechanism of the action of gluten in coeliac disease and the question of psychosomatic factors were briefly discussed by other speakers. In his reply Professor Frazer pointed out that the fundamental concept of sprue as an alimentary dysfunction was put forward originally by the President, Sir Neil Fairley. The latter in concluding said he was probably the only speaker of the evening who had personally suffered from tropical sprue. "He was quite satisfied that tropical sprue developing in Europeans living in South East Asia and the Far East was not a primary deficiency disease, that it responded with remarkable constancy to a high protein meat diet, low in fat and carbohydrate, plus large doses of crude liver extract given orally, and that the vast majority of patients were ultimately completely cured. This was far from being the case with idiopathic steatorrhoea which, in his experience, was an unsatisfactory disease to treat and not infrequently ended fatally." *B. G. Maegraith*

MEYER, L. M. & BERTCHER, R. **Blood Volume Studies in Pernicious Anemia and Non-Tropical Sprue.** *Proc. Soc. Exper. Biol. & Med.* 1952, Nov., v. 81, No. 2, 511–13.

"1. During the period of reticulocyte response, the blood volume in 4 patients with pernicious anemia remained constant, an increase in red cell mass being balanced by reduction of plasma volume. 2. One patient with idiopathic steatorrhea, edema and macrocytic anemia showed diminution of total blood volume despite a rise in red cell mass during the period of reticulocytosis."

BERTCHER, R. W. & MEYER, L. M. **Erythrocyte Potassium Levels in Pernicious Anemia and Non-Tropical Sprue.** *Proc. Soc. Exper. Biol. & Med.* 1952, Nov., v. 81, No. 2, 383–4.

"Erythrocyte potassium content is unaltered in the relapsed stage of pernicious anemia and non-tropical sprue. No change is noted during the period of reticulocytosis and red blood cell regeneration."

HAEMATOLOGY

GUELMINO, D. & JEVTIĆ, M. Makrocitna anemija usled nepravilne ishrane i njen odnos prema malariji. [**Macrocytic Anaemia due to Incorrect Nutrition and its relation to Malaria**] *Higijena*. Belgrade. 1952, v. 4, No. 6, 313–22. French summary.

These studies were made in 1949 in a part of Serbia where, for several decades in the past, malaria was endemic. Formerly, the splenic index was 30 to 50 per cent. and the species of parasite were *P. vivax* (74·5 per cent.) *P. falciparum* (25·1) and *P. malariae* (0·4 per cent.). The combination of infantile splenomegaly, malnutrition of the general population and widespread anaemia was responsible for a high degree of ill-health.

From 1943 onwards, active control measures with DDT reduced the incidence of malaria considerably and in 1949, the splenic index was only 2 per cent. : in only 2 cases were malaria parasites found in the blood, where previously

such cases were counted in thousands. With the decline in malaria, the accompanying anaemias were correspondingly reduced. Among 37 cases of anaemia in the authors' series, 24 were secondary anaemias of different origins, 1 accompanied quartan malaria, 3 kala azar and 3 were of the Addisonian type. Only 6 were identified as nutritional macrocytic anaemia. The characteristic feature of these cases was extreme protein deficiency and there was no clinical resemblance to the Addisonian type or to pellagra. Apart from malaria, there was another factor responsible for the seasonal appearance of this anaemia, namely, reduction in the quality of the food of the population in the summer together with excessive physical work : at this time, the food was largely composed of carbohydrate.

Taking into account the fact that the food in this region is not always or completely deficient in protein, as it so often is in the tropics, the authors consider that the morbidity is not great in these anaemias and that the nutritional type is confined to the poorest peasants. Most of the anaemias accompanying malaria epidemics in the past were therefore secondary anaemias due to chronic malaria and frequent reinfection. *H. J. O'D. Burke-Gaffney*

Languillon, J. L'anémie tropicale de nutrition. (A propos de deux observations chez des Noirs de la Guadeloupe). [**Tropical Nutritional Anaemia ; a Report on 2 Cases in Negroes in Guadeloupe**] *Méd. Trop.* Marseilles. 1951, Sept.–Oct., v. 11, No. 5, 796–804, 2 charts.

The tropical macrocytic anaemia of Wills is not rare in Guadeloupe. The author reports two cases in which the therapeutic effect of folic acid and vitamin B_{12} was spectacular.

The first patient was a carpenter of 34 years suffering from increasing weakness, loss of weight and watery diarrhoea, of 8 months' duration, which had resisted treatment.

He was clinically very anaemic, emaciated, breathless on the least exertion and oedematous in the lower limbs. His pulse was rapid and his heart dilated. There was no fever, jaundice, glossitis or stomatitis. The abdomen was tympanitic but there was no enlargement of the liver or spleen ; the lungs were clinically and radiologically normal, and the urine was normal. There were ancylostome ova in the stools.

There was free hydrochloric acid in the gastric contents after histamine.

The blood showed a hyperchromic anaemia (1,000,000 red cells per cmm.) with macrocytosis 2 per cent. megaloblasts and a leucopenia (3,000 leucocytes per cmm.) with 32 per cent. neutrophiles and 68 per cent. lymphocytes. There was no increase of bilirubin. The bone marrow showed an intense megaloblastic reaction.

The patient was given 50 mgm. of folic acid daily, with vitamin C and nicotinic acid ; there was a dramatic clinical improvement ; there was a reticulocyte crisis on the fifth day and a steady increase in red cells which reached 4,600,000 per cmm. on the 40th day ; the leucocytes also showed an immediate increase to 6,000 per cmm. by the 5th day ; the eosinophiles percentage reached a peak of 12 per cent. on the 15th day and the monocytes 11 per cent. on the 25th day ; and megaloblasts disappeared from both the peripheral blood and the sternal puncture smear.

The patient continued to live on a vegetarian diet but improvement was maintained.

The second case was that of a Negro aged 26 years ; he presented an almost exactly similar clinical picture, but his blood count did not show such extreme anaemia (red cells 1,800,000 per cmm.), there were no nucleated red cells, and the sternal puncture smear was not so extremely megaloblastic.

He was given vitamin B_{12}, 20 mgm. daily for 4 days, after which the injections were spaced so that he received 210 mgm. in 20 days. The clinical and haematological results were similarly spectacular ; there was a reticulocyte crisis (22 per cent.) on the 3rd day and by the 24th the red cells were 4,500,000 per cmm.

The author discusses the results and compares this (tropical) deficiency anaemia with the anaemia of Biermer and the anaemia of sprue. He considers that vitamin B_{12} is the most effective treatment in the tropical anaemia ; in the other conditions it is effective but relapses may occur. *L. E. Napier*

Dickstein, B. **Changing Concepts in the Hemolytic Anemias of Childhood.** *Amer. J. Med. Sci.* 1952, Dec., v. 224, No. 6, 679–93. [62 refs.]

Silvestroni, E. & Bianco, Ida. **Contributions to the Modern Knowledge of Certain Diseases of the Blood and Constitutional Hematological Abnormalities.** *Scientia Med. Italica.* 1951, Apr.–June, v. 2, No. 2, 269–310, 20 figs. [Numerous refs.]

This is an extensive account of the authors' work on thalassaemia. There are 45 references to papers by Silvestroni and his colleagues, published within the last 10 years. There is also a description of observations in Italy on the sickle-cell trait, sickle-cell anaemia and the combination of sickle-cell trait and thalassaemia called microdrepanocytosis, on ovalocytosis, both as a harmless curiosity and as a cause of anaemia. Four types of individuals showing thalassaemia are differentiated : heterozygous healthy carriers of microcytaemia, heterozygous carriers suffering from a mild constitutional anaemia, heterozygous carriers suffering from a severe constitutional anaemia, and homozygous individuals suffering from Cooley's disease. The varying manifestations of the microcytaemic single genes are explained as the outcome of interaction with modifying genes which are inherited independently and which interfere in various ways with the gene, sometimes attenuating, sometimes aggravating its manifestation. These genes would also be responsible for the differences in severity of Cooley's disease. The authors seem to have abandoned the suggestion that the survival of the gene (at one time thought to be invariably fatal in homozygotes) was due to increased fertility of afflicted parents. *H. Lehmann*

Humphreys, J. **Observations on the Sickle Cell Trait in Nigerian Soldiers.** *J. Trop. Med. & Hyg.* 1952, Aug., v. 56, No. 8, 173–6, 2 maps.

It was shown that there is no significant difference in the incidence of sickling among 839 soldiers from northern, western and eastern Nigeria. No difference was found between the heights and body weights of those with and without the trait, nor was the incidence of splenomegaly or ulceration of the legs different in the two groups. While the study was being carried out it was noted that the rate of sickling and the percentage of cells showing sickling varied by up to 85 per cent. in the same individual on successive days. The average incidence of sickling was 16·9 per cent. *A. W. Woodruff*

Languillon, J. L'anémie à hématies falciformes. À propos de deux nouvelles observations chez des Noirs de la Guadeloupe. [**Sickle-Cell Anaemia ; 2 Cases in Negroes of Guadeloupe**] *Méd. Trop.* Marseilles. 1951, May–June, v. 11, No. 3, 427–38, 2 figs. [33 refs.]

The author first gives a definition and the history of sickle-cell anaemia and the sickle-cell trait, including a reference to the earliest observations of these conditions.

In 3,000 blood examinations of Negroes in Guadeloupe he found sickling in 240 or 8 per cent. Among 25 infants there were no cases of sickling but otherwise there was no significant difference in the percentages in the various age-groups, or between the sexes. He also examined the blood of 150 white persons without finding a single case of sickling.

He reports two cases of sickle-cell anaemia :

The first patient was a female Negro, aged 35, in a maternity hospital where she gave birth to her 6th child. She presented a picture of haemolytic anaemia with oedema of the lower extremities but without fever. Her liver was large and painful, but the spleen could not be percussed. She had an enlarged heart with a systolic murmur at the apex. There were no ulcers on the legs nor any radiographical changes in the bones.

The blood showed 2,000,000 red cells per cmm. with 19 per cent. reticulocytes and nucleated red cells (55 per 100 white cells) ; sickling occurred within an hour in a cover-slip preparation. The sedimentation rate was 20 mm. in one hour and there were decreased fragility and a bilirubinaemia of 15 mgm. The bone marrow showed a marked normoblastic reaction.

The second patient, a male aged 30 years, was the brother of the first patient. He appeared younger than his years ; he had mongoloid facies, narrow shoulders, a cylindrical chest, and sabre tibiae. He had ulceration of the legs, clinical anaemia, and icteric conjunctivae. There was no history of abdominal crises and the spleen and liver were normal. The heart was rapid with a systolic murmur and a low-tension pulse. The tibiae showed osteoporosis and a periosteal reaction. The blood showed a haemolytic anaemia and the marrow a normoblastic reaction.

The mother and 3 siblings of these 2 patients showed no evidence of sickling, but 2 other siblings showed the sickling trait, as also did 2 out of 5 of the children of the first patient.

The author then gives a short general description of sickle-cell disease, which follows the usual lines. *L. E. Napier*

GALLAIS, P. Contribution à l'étude de la maladie à hématies falciformes. [**Observations on Sickle-Cell Anaemia**] *Arch. Méd. Gén. et Trop.* 1952, May–June, v. 29, No. 3, 117–23.

The author does not think it justified to assume that there is an absolute difference between sickle-cell anaemia as a disease and the presence of the sickle-cell trait as a harmless curiosity. He has observed 11 African sickle-cell trait carriers in a military hospital in Marseilles. None of the men was anaemic, but most of them showed physical changes described in sickle-cell anaemia patients and there were interludes of pyrexia and in one case even attacks of *fureur homicide inopiné et sans raison.* From his observations on the 11 men the author advances the theory that certain mental features well known in African pathology may find their rational explanation in brain changes due to sickle cells and he rightly concludes that if this new hypothesis were confirmed it would be of considerable anthropological and medico-legal importance. *H. Lehmann*

BANKS, L. O., SCOTT, R. B. & SIMMONS, Juliette. **Studies in Sickle Cell Anemia. Inheritance Factor, including Effect of Interaction of Genes for Sicklemia and Thalassemia.** *Amer. J. Dis. Children.* 1952, Nov., v. 84, No. 5, 601–8, 2 figs. [Refs. in footnotes.]

The authors examined the relatives of 16 American Negro children suffering from sickle-cell anaemia ; 14 mothers, 11 fathers and 35 siblings were available.

Of the siblings 18 were normal, 2 showed sickle-cell anaemia and 15 were carriers of the trait. All the fathers and all but one of the mothers were sickle-cell trait carriers. With the exception of the findings of a non-sickling mother the observations agree with the theory that the anaemia appears in persons homozygous for the sickling gene, and that heterozygotes are trait carriers only. The offspring of the non-sickling mother was a typical case of sickle-cell anaemia as far as the clinical picture was concerned. A micro-photograph of a moist preparation of the blood shows about 60 per cent. sickle cells, the others look normal and there seem to be no target cells ; an electrophoretic analysis showed 83 per cent. sickle-cell haemoglobin.

The blood smears of the non-sickling mother, however, showed numerous target cells and hypochromia, the cells showed an increased resistance to hypotonic saline solutions and the authors diagnosed the condition as thalassaemia minor. The heterozygous combination of thalassaemia and sickling is known to give rise to a modified sickle-cell anaemia. The father of the patient was dead and could not be investigated, but the authors assume that he must have possessed the trait. This is apparently the first time that thalassaemia has been seen in a Negro and also that it has been suggested that a single sickling gene can be responsible for as much as 83 per cent. of the abnormal haemoglobin.

Not all the parents showed sickling on first examination and of 25 bloods incubated without reducing agents and with sodium bisulphate and a culture of *Bacillus subtilis*, positive results were given at first only by 12, 19 and 20 respectively. There are a number of conclusions one might draw from the remarkable failure rate of 25 per cent. for the bacillary and bisulphate tests and of 50 per cent. for simple incubation. The comment made in this paper is that " reports of the absence of sickling in parents of patients with sickle cell anemia may be attributed in part to failure of the authors to examine several specimens for sickling ". *H. Lehmann*

Singer, K. & Fisher, B. **Studies on Abnormal Hemoglobins. V. The Distribution of Type S (Sickle Cell) Hemoglobin and Type F (Alkali Resistant) Hemoglobin within the Red Cell Population in Sickle Cell Anemia.** *Blood.* 1952, Dec., v. 7, No. 12, 1216–26, 5 figs. [22 refs.]

" 1. By transfusing sickle cell anemia erythrocytes with a relatively high concentration of F hemoglobin into normal recipients, it was demonstrated that the disappearance rates of the transfused cells and of their alkali resistant pigment consistently showed great discrepancies. These observations suggest an unequal distribution of the F pigment within the erythrocyte population. A nonuniform distribution of F hemoglobin could also be detected in vitro by exposing sickle cell anemia bloods to mechanical trauma for a longer period of time. The cells most resistant to trauma contained a higher percentage of F hemoglobin than the original blood specimen.

" 2. The red cell population of patients with sickle cell anemia seems to be composed of three main fractions : (1) cells containing S hemoglobin and no or little F hemoglobin, (2) cells containing both pigments and (3) cells containing F pigment with no or little S hemoglobin.

" 3. The erythrocytes carrying mostly S hemoglobin have the shortest life span, whereas the red cells containing mostly F hemoglobin have the longest survival time.

" 4. The significance of these findings in regard to clinical and genetic aspects of sickle cell anemia is discussed. No direct correlation is demonstrable in an individual patient between the absolute amounts of either type S or type F hemoglobin and the severity of the anemia. The latter depends on the

variable size of the portion of red cells containing mostly S hemoglobin, and also on the ability of the marrow to replace this particular fraction."

Ellenhorn, M. J. & Weiner, D. **Sickle Cell Trait and Frostbite.** *U.S. Armed Forces Med. J.* 1952, Dec., v. 3, No. 12, 1845–51. [Refs. in footnotes.]

"In Negroes the presence of the sickle cell trait does *not* appear to be significantly related to the causation of frostbite. The appearance of the sickle cell trait apparently is *not* influenced by exposure to cold. Sicking has *no* apparent relationship to blood group agglutinogens in Negroes, or to cold agglutinins in control subjects and in patients with frostbite."

Potenza, L., Irazábal, J. & Barnola D., J. Lesiones meningoencefalicas en un niño con anemia falciforme. [**Meningoencephalitic Lesions in a Child with Sickle-Cell Anaemia**] *Archivos Venezolanos Puericult. y Pediat.* 1952, Jan.–Mar., v. 15, No. 43, 68–76, 3 figs. on 2 pls.

McFadzean, A. J. S. & Wong, C. C. **Intravenous Iron in the Management of the Anaemia of Ancylostomiasis.** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1952, Nov., v. 46, No. 6, 674–7, 1 graph.

Chinese patients suffering from anaemia due to ankylostomiasis with haemoglobin levels below 6 gm. per cent. were treated with iron, both intravenously (25) and by mouth (14). Results of the two therapies were compared. All patients' bone marrow showed normoblastic hyperplasia. The intravenously treated group consisted of 11 males and 14 females, the ages ranging from 15 to 42 years. After a 7-day control period during which no significant blood changes were seen the approximate haemoglobin iron deficiency was calculated and 50 per cent. were added to this calculation in order to replete the non-haemoglobin iron stores.

The iron was given as the saccharated oxide ("Ferrivenin") at a concentration of 20 mgm. Fe per ml. : 50 mgm. were given on the first day, 100 mgm. on the second and 200 on the third and subsequent days until the calculated total had been administered. The worms remained *in situ* and it was of interest that with the improvement of the anaemia the only symptom which was not relieved was dyspepsia ; oedema when present rapidly resolved, enlarged cardiac shadows became normal and cardiac murmurs disappeared ; previously palpable livers became impalpable. Plasma albumin when low returned to normal levels and serial liver biopsy performed in 3 patients showed a progressive resolution of fatty degeneration. The haemoglobin rise was so uniform that it became possible to predict haemoglobin levels with some accuracy. After a 3-day lag period there was a daily rise by about 0·3 gm. per cent. until a level of about 9 gm. per cent. was reached, after this the average daily increase was 0·17 gm. per cent. In addition to this series a patient known to be refractory to iron by mouth was treated intravenously and the response was the same.

The group treated by mouth consisted of 6 males and 8 females with ages ranging from 19 to 45 years. These patients received 1·5 gm. ferrous sulphate and 150 mgm. of ascorbic acid in divided doses daily. They also improved but the haemoglobin rose more slowly. From the accompanying graph the daily increase seemed to be about half that of the rise seen in intravenous treatment.

[This paper has a bearing on the problem of the very long stay in hospital of patients with severe ankylostomiasis. One may find the additional work of

daily injection with the small risk attached to it preferable to being forced either to refuse accommodation to new patients or to discharge anaemia patients when they are only partly cured. Unfortunately it is not stated how it was made certain that the results by oral treatment were the best that could be achieved by this means. In how many doses were the 1·5 gm. ferrous sulphate divided ? The smaller the dose of iron the less will be absorbed. In India and in Africa rises in haemoglobin level nearly as dramatic as those following the authors' intravenous therapy could be obtained by giving ferrous sulphate in larger doses : twice daily 1·3 gm. ferrous sulphate dissolved in dilute HCl containing glucose given with 100 mgm. ascorbic acid in a large glass of water or lemonade.] *H. Lehmann*

VENOMS AND ANTIVENENES

KEEGAN, H. L. **Geographic Distribution of** *Latrodectus hasseltii*. *Amer. J. Trop. Med. & Hyg.* 1952, Nov., v. 1, No. 6, 1043–6. [12 refs.]

There is an element of doubt regarding the geographical distribution of *Latrodectus hasseltii*. It has been looked upon as the far eastern equivalent of *L. mactans*, the black widow spider of the New World, and found in Australia where it is known as the " red back " spider, in the South Pacific islands and the Philippines. Records of occurrence also come from Africa, India, Burma and the Persian Gulf, but other workers are of the opinion that these latter are immature specimens of *L. indistinctus* or *L. tredecimguttatus*, and the *L. katipo* of New Zealand may be a synonym of *L. hasseltii*. Described differences such as the colour pattern, length of the first pair of legs, lack of acanthoid setae (in *L. katipo*) are, none of them, regarded as valid characters for differentiation or criteria for separating the species. " Close relationship of *hasseltii*, *katipo*, *tredecimguttatus*, *menavodi*, *indistinctus* and *mactans* is revealed by the fact that females of these species have identical epigynes, and that palpal structure of males is alike." The so-called new species found in Cebu Island, *L. agoyangyang* (the abdomen of this spider was noticed to resemble the black and red fruit of the goyangyang plant) has proved to be *L. hasseltii*.

L. hasseltii has been recorded once from Luzon, but is widely distributed among the larger Philippine Islands south of Luzon. Specimens have also been found on Tinian Island (one of the smaller Polynesian Ladrone group) since the war, which " makes its range comparable with that of *mactans* ". It has a potent venom ; a white mouse bitten on a hind leg suffered from convulsive tremors, dyspnoea and paralysis of the legs and died in 25 minutes, and a guineapig in 45 minutes, and haemorrhages in lungs, body cavity and pericardium were found at autopsy. *H. Harold Scott*

COURIC, E. S. **Effective Treatment for Black Widow Spider Bite.** *Southern Med. J.* 1952, Dec., v. 45, No. 12, 1193.

The author, from Miami, Florida, reports 3 cases in which epinephrine was used effectively in the treatment of bites by the black widow spider, *Latrodectus mactans*.

In the first case, a man of 37 bitten on the arm was extremely ill, with shock, vomiting and generalized muscular cramps, together with severe pain and defective vision in the left eye. He showed no response to two ¼ grain injections of morphine within 30 minutes' interval. In 1½ hours, the patient appeared to be moribund, and—because epinephrine is used in serum reactions—it was

given in a dose of 10 minims subcutaneously [strength not stated]. Within 7 minutes, cramps had ceased, the pulse was almost normal and the patient seemed to be quite well, except that the eye condition persisted. Six hours later, the attacks recurred but prompt administration of epinephrine removed all symptoms within 3 minutes. On every further occasion, the same immediate response occurred, and symptoms disappeared finally in 36 hours. Thereafter calcium gluconate was given intravenously daily for 6 days. Unfortunately the loss of sight in the left eye has persisted, apparently because of an embolus. The author speculates whether the sight might have been saved if epinephrine had been given as soon as the patient was first seen.

In two other cases, 8 and 7 minims of epinephrine, respectively, were given as soon as the patients were seen and symptoms were relieved immediately within 6 minutes, without any other treatment.

The author points out that the usual treatment for *Latrodectus mactans* bites had been calcium gluconate intravenously and morphine. Recovery usually took several days, and cases sometimes ended in death. He can find no previous record of epinephrine having been used in such cases. Evidently the recovery, where epinephrine was used, was prompt and dramatic.

H. J. O'D. Burke-Gaffney

Braganca, B. M. & Quastel, J. H. **Enzyme Inhibitions by Snake Venoms.** *Biochem. J.* 1953, Jan., v. 53, No. 1, 88–102, 15 figs. [54 refs.]

"1. Investigations have been made on the effects of snake venoms heated at 100° for 15 min. on a variety of enzyme systems. Such venoms still retain toxicity to animals.

"2. The enzymic systems concerned with the oxidation of glucose, pyruvate, L-glutamate, succinate, α-ketoglutarate and fructose by brain homogenates are inhibited by small quantities of the heated venoms.

"3. Pyruvic dehydrogenase of brain, succinic dehydrogenase of brain and heart, cytochrome oxidase of brain, and choline oxidase of liver are all vigorously attacked.

"4. The following systems are not attacked: anaerobic glycolysis by rat brain, glucose fermentation by yeast extract, pyruvic acid dismutation by pigeon liver, hexokinase, glucose oxidase of liver, and glucose oxidase of fungi (notatin), soluble pyruvic dehydrogenase of pigeon-breast muscle, lactic and malic dehydrogenases, and urease. Cytochrome *c* is not broken down.

"5. The enzyme systems that are not attacked by heated venom are distinguished from those that are attacked by being active in aqueous cell-free tissue extracts and are apparently independent of cellular structures for their activities.

"6. Heated snake venom contains a heat-stable enzyme (probably a lecithinase) that attacks brain phospholipins or lipoproteins. Its inhibiting effect on a susceptible enzyme system is enhaced by calcium ions which activate lecithinase.

"7. It is suggested that heated venoms exert their inhibitive effects by enzymic degradation of mitochondrial structures upon whose integrity or particular spatial configurations the enzyme systems concerned depend for their optimal activities."

Schöttler, W. H. A. **Experimental Study on the Importance of Early Antivenin Treatment in Snake Bite.** *Amer. J. Trop. Med. & Hyg.* 1952, Nov., v. 1, No. 6, 1038–42.

"Mice were injected subcutaneously with venoms of *Bothrops jararaca* or *Crotalus terrificus* and treated with antivenins by intravenous or subcutaneous

routes at varying intervals afterwards. The time interval between venom and antivenin injections at which 50 per cent. of the animals survived, was 4 minutes if subcutaneous and 215 minutes if intravenous with the *Bothrops* venom, and 116 minutes if subcutaneous and 319 minutes if intravenous in the case of *Crotalus*."

DERMATOLOGY AND FUNGUS DISEASES

BURKE, Ruth C., SALVIN, S. B. & GERLOFF, R. K. **Cultivation of *Coccidioides immitis* in the Developing Hen's Egg.** *Proc. Soc. Exper. Biol. & Med.* 1952, Oct., v. 81, No. 1, 91–4.

Opposite opinions on the value of the incubating, fertile egg as a medium for the propagation of *Coccidioides immitis* in the spherule form have been expressed by VOGEL and CONANT [this *Bulletin*, 1952, v. 49, 798 ; 1953, v. 50, 62] and NEWCOMER *et al.* [*ibid.*, 1952, v. 49, 995]. In the present study, 630 eggs containing developing chick embryos aged from 3 to 12 days were employed, and inoculations of 0·1 ml. amounts of a suspension of chlamydospores and mycelial fragments from a culture of *C. immitis* were made into the allantoic sac, the yolk sac and on the chorio-allantoic membrane, by the technique of BEVERIDGE and BURNET. The death rate from the inoculation was 100 per cent. in the case of the 3-day embryos, falling progressively to 73 per cent. with the 8-day embryos, and then to 24, 19, 15 and 7 per cent. respectively in the 9, 10, 11 and 12-day embryos. The high mortality rates make the 3 to 8-day embryos unsuitable for the experiment on the conversion of the fungus from the mycelial to the parasitic form, although they might be used for chemotherapeutic studies. On the other hand, the use of 12-day embryos would leave the time available for incubation after inoculation rather short for an adequate study of the morphological changes in the fungus ; for this purpose 8 to 10-day embryos are more suitable.

The yolk seemed to be the best medium for the development of the sporangial form of the fungus, which was seen to arise from an initial mycelial growth, sometimes as early as the fifth day of incubation. These sporangial forms were few and sometimes difficult to identify. The mature sporangia varied greatly in size, but many were about 10 to 15μ in diameter. In some of these the cleavage of the protoplast, leading to the formation of endospores, was seen and it was noted that the process of cleavage was rapid, occupying only a few minutes.

J. T. Duncan

SIMONS, R. D. G. Ph. **Handbook of Tropical Dermatology and Medical Mycology.** Vol. 1.

This book is reviewed on p. 362.

LANGERON, M. **Précis de mycologie. Mycologie générale, mycologie humaine et animale, techniques.** 2nd Edition. [A Précis of General, Human and Animal Mycology]

This book is reviewed on p. 359.

TROPICAL OPHTHALMOLOGY

SARKIES, J. W. R. **Onchocerciasis and Trachoma in the Gold Coast.** *Ann. Trop. Med. & Parasit.* 1952, Nov., v. 46, No. 3, 214–17, 1 map.

An analysis of some ophthalmic cases in the Gold Coast is reported by the author, which consisted of 2 series ; the first of 906 consecutive cases seen during a tour of the Northern Territories ; the second of 1,106 seen in the general hospital in Accra. All the patients were examined during the dry weather. In the first series of 906 patients, 502 were found to be suffering from ocular onchocerciasis and 291 from trachoma.

In Accra local onchocerciasis was not seen and trachoma was comparatively rare.

The proportion of patients who were blind was greatest where onchocerciasis occurred. *E. W. O'G. Kirwan*

MAKARI, J. G. **Benadryl and Sulfadiazine in the Treatment of Trachoma.** *J. Trop. Med. & Hyg.* 1952, Dec., v. 55, No. 12, 263–5. [11 refs.]

On the supposition that the hyperplastic conjunctival lesions in trachoma, where sulphonamides alone were relatively ineffective, represent an allergic response, the author carried out an experiment on the combined use of benadryl and sulphadiazine in trachoma cases with these lesions as seen in stages ii and iii.

Treatment was carried out on 13 patients in stages ii and iii. These were divided into 2 groups. One group consisting of 7 patients received sulphadiazine by the mouth, 3 gm. daily for 5 days, plus benadryl by the mouth, 75 mgm. daily for 5 days. The other group received benadryl only in the same dosage as the first group.

Within 24 hours of the start of treatment both groups experienced subjective improvement and after 2 weeks objective improvement was very marked in the group receiving combined sulphadiazine and benadryl.

The author is of the opinion that the addition of benadryl to sulphonamides in the treatment of trachoma not only helps to alleviate the subjective symptoms earlier and to cut down the dosage of the sulphonamide and therefore its toxicity, but also helps to reduce the associated allergic hyperplastic tissue response so that the sterilizing effect of the sulphonamides is better accomplished. *E. W. O'G. Kirwan*

CHAMBERLAIN, W. P., Jr. **Ocular Findings in Scrub Typhus.** *Arch. Ophthalmology.* 1952, Sept., v. 48, No. 3, 313–21.

A group of 150 patients with scrub typhus, largely from an outbreak of the disease at Sansapor in Netherlands New Guinea, were examined by the author in 1944 and a variety of ocular lesions were encountered. There were no uniform ocular complaints. In about two-thirds of the patients there was pain in the eyeballs which was aggravated on movement of the eyes and most pronounced during the initial stages of the disease. Photophobia, lachrymation and conjunctival discharge were less frequently seen.

The objective findings were divided into three groups according to the structures affected : (1) adnexa and external tissues of the eye, (2) iris and anterior segment of the globe proper, and (3) posterior segment, particularly the retina and optic nerve. The most extensive lesion of the adnexa was the eschar which developed at the site of the mite bite and was accompanied by considerable swelling of the eyelid with enlargement and tenderness of the

preauricular or submaxillary glands. Three such cases occurred in the series. Two cases of rather severe bilateral iridocyclitis were seen. This responded slowly to treatment, necessitating 4–6 weeks' therapy.

The most characteristic and frequent manifestation of ocular involvement was oedema of the optic nerve and retina with an associated enlargement of the blind spots.

In most cases the oedema subsided within a few weeks leaving no apparent residual defects.

This oedema of the papilla and surrounding retina constituted the cardinal feature of what has been termed " scrub typhus retinopathy ".

E. W. O'G. Kirwan

CROLL, M. & CROLL, L. J. **Ocular Manifestations of Trichinosis.** *Amer. J. Ophthalm.* 1952, July, v. 35, No. 7, 985–92, 6 figs. [10 refs.]

Two cases with ocular manifestations of trichinosis are reported by the authors, both occurring in white women. A clinical diagnosis was established in one case and in the other it was confirmed by biopsy. The disease is diagnosed by the acute onset usually associated with nausea, vomiting and abdominal cramps ; high temperature lasting at times from two to five weeks, eosinophile count varying from 30 to 80 per cent. ; generalized muscle pains, tenderness and soreness with predilection for the deltoid, the hamstring group of muscles and the diaphragm and the extreme swelling of the eyelids, chemosis of the conjunctiva, and pain in the eyeballs with limitation of movement of the ocular muscles.

The microscopic appearance of the larvae in the muscles, with 3 micrographs is reported and the differential diagnosis discussed. Treatment is symptomatic, but penicillin is contraindicated, as there may be an allergic reaction.

E. W. O'G. Kirwan

MISCELLANEOUS DISEASES

RIZZOTTI, G. Il latirismo in Etiopia. [**Lathyrism in Ethiopia**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1952, Sept., v. 33, No. 9, 493–500. English summary (6 lines).

Lathyrism, under the local name *guaia besctà* (which means lathyrus disease), is generally believed to have been very common in Ethiopia in times of famine, but the author has seen three cases only during a residence of 12 years. Some writers have ascribed the symptoms to poisoning by the seeds of *Lathyrus sativus* ; others to food deficiencies, *Lathyrus* playing little or no part ; others, again, to a combination of *Lathyrus* poisoning and vitamin deficiency. [See this *Bulletin*, 1948, v. 45, 931 ; 1949, v. 46, 399 ; 1950, v. 47, 496, 779 ; 1951, v. 48, 198.]

The author proceeds to relate details of his 3 patients, in all of whom the symptoms were typical and characteristic : i. A man of 20 years, in poor circumstances, who in the 3 months before the onset of symptoms had been living largely on *Lathyrus* seeds. He was given multivitamin preparations but his condition changed little during the 2 months he was in hospital ; he then left and was lost sight of. ii. The second patient was a peasant, 31 years of age, who for 6 months had lived mainly on seeds of *Lathyrus*, milk, butter and bananas. His symptoms appeared 2 months before he presented himself for treatment. He was given multivitamins and Baccelli's mixture [not defined] and 6 months later reported " slight improvement ". iii. The third was also

a peasant, 37 years of age, reported as having suffered from malaria in the past [but parasites were not found in his blood]. For a year and a half he had fallen on bad times ; food had been insufficient and he had fed himself largely on seeds of *Lathyrus*. Four months after starting on this diet, paraesthesiae and lumbar pains appeared and he had increasing difficulty in walking ; for about a year he had not been able to get about without assistance, but during that time he had been taking food good in quality and sufficient in quantity. Faecal examination revealed *Ascaris* ova in small numbers and *E. coli* and its cysts. The helminthic infection was treated and, in view of the history of malaria, he was given quinine and plasmoquine [although parasites were not found] and he was put on general tonic treatment with multivitamin products and liver extract. After 10 days in hospital he left at his own request and continued his treatment at home. When seen a month later, he seemed to be in better general health, but otherwise his symptoms were unchanged. It would appear from these cases that the symptoms of lathyrism were due to some toxin in the seeds rather than to any avitaminosis. *H. Harold Scott*

Ponseti, I. V. & Baird, W. A. **Scoliosis and Dissecting Aneurysm of the Aorta in Rats fed with** *Lathyrus odoratus* **Seeds.** *Amer. J. Path.* 1952, Nov.–Dec., v. 28, No. 6, 1059-77, 1 text fig. & 12 figs. on 7 pls.

" White rats fed a diet containing 50 per cent *Lathyrus odoratus* seeds all developed kyphoscoliosis. The scoliosis appeared to result from osteoporosis and collapse of several vertebrae. Paraplegia developed in 2 rats with very severe kyphoscoliosis and cord compression.

" Aneurysms of the thoracic aorta were seen in 6 of the 8 animals which died intercurrently. The aneurysms developed when the vertebral deformity was still mild.

" No toxic lesions were demonstrable in the liver, kidney, or other organs.

" *Lathyrus odoratus* seeds appear to contain a toxic factor which affects the formation of organic bone matrix, the aorta, and possibly other mesodermal structures."

Rizzotti, G. Il problema del loglio in Etiopia. [**The Problem of Lolism in Ethiopia**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1952, Aug., v. 33, No. 8, 437–45. English summary (8 lines).

Lolism is poisoning by *Lolium temulentum* or poisonous darnel. The plant is now rarely found in the wheatfields of European and other advanced countries. It occurs in Ethiopia, but cases of poisoning were seldom seen, because the risk is known locally and farmers and dealers have in the past seen to the removal and checking of this contaminant. Some bulk-buying missions who were effecting large-scale (wartime) purchases in 1942 were obviously unaware of this contaminant and traders and farmers who dealt in and produced the wheat became less careful. When this was discovered all deals in grain were suspended in the latter part of 1943 and the author of this paper was entrusted with the study of the problem and the devising of necessary preventive measures.

In 1942–3 Rizzotti dealt himself with 2 outbreaks of lolism—in a prison and a flour mill respectively—and had first-hand information of a third outbreak in a school, from the school medical officer. All 3 incidents were in Addis Ababa. In every case there was spontaneous recovery within 24 hours.

Of 72 prisoners at risk, 40 suffered the effects of this food poisoning. All complained of vertigo, buzzing in the ears and nausea, a few of vomiting,

abdominal pain and diarrhoea, and 2 were in addition in a " drunken " state, being incoherent and talkative. These 2 had consumed a double ration, about 900 gm., of the affected bread.

At the flour mill, the food poisoning had affected 8 labourers who had irregularly taken some flour which had been put aside for destruction after having inadvertently been milled from grain which was heavily contaminated. Darnel starch was subsequently identified in the left-overs of pancake and the flour from which it had been made. When seen, 2 of the patients were asleep and the others were unable to stand upright.

The third outbreak was traced to bread and the contamination was demonstrated in the original flour. About 30 persons were involved.

Rizzotti found that if extraction was limited to very white (OO) flour, the product was not poisonous even when a moderate admixture of darnel seeds had been left in the grain. This suggests that the toxic substance is removed with the offal and is very probably produced within the microscopic mould which grows on the outside of the darnel seed.

If the grain is to be milled into a very white (OO) flour, up to 1 per cent. contamination with *lolium*, representing 4 darnel seeds for every 100 wheat grains, is now permitted in Ethiopia.

Though the darnel seeds are not difficult to pick out among wheat grain, it is less easy to identify the contaminating starch in the milled flour.

J. Cauchi

Alkan, W. J., Freudenthal, M. L. & Steinitz, E. **An Epidemic of Pulmonary Disease with Blood Eosinophilia. (Eosinophilic Disease).** *Trans. Roy. Soc. Trop. Med. & Hyg.* 1952, Nov., v. 46, No. 6, 666-73. [21 refs.]

In 1948, 74 patients were treated at a hospital in Jerusalem for an epidemic illness characterized by eosinophilia and transient pulmonary infiltrations. All of the patients had been working on a closed subterranean canal which had been used as a sewer and most of them had been in contact with high explosives.

About 1 to 3 days after work in the sewer patients began to complain of headache, tiredness, coryza and cough. On the 6th or 7th day after work the temperature rose suddenly and there was irritation of the conjunctiva, nausea and loss of strength. Cough was accompanied by wheezing and dyspnoea. Cyanosis, circulatory failure and even collapse, were noticed in the worst cases. Most patients suffered a high remittent fever lasting from 1 to 12 days. The cough was initially dry, but later associated with scanty sputum which was sometimes purulent and in two cases blood-stained.

A few patients suffered from a transient itching macular rash resembling the eruption of " eosinophilic erythroedema ". All hospital cases showed leucocytosis, the maximum being 26,700 per cmm. with eosinophilia up to 12,000 per cmm., usually disappearing in from 2 to 5 weeks. No tubercle bacilli, fungi or helminth larvae were found in the sputum. Specimens of urine and sputum were examined for trinitrotoluene and picric acid, but none was found. Coccidioidin tests and examination of faeces for helminth ova produced no conclusive results. Laboratory animals remained unaffected after 48 hours' exposure in the sewage canal, and no disease occurred in rodents injected with the blood of a patient who for many months had been suffering from the recurrent skin disease.

H. T. H. Wilson

Duroux, Jarniou, Colas & Celerier. Un cas de mélioïdose pulmonaire. [**A Case of Pulmonary Melioidosis**] *Bull. et Mém. Soc. Méd. Hôpit. de Paris.* 1952, v. 68, Nos. 28/29, 1061–5.

See also this *Bulletin*, 1952, v. 49, 724.

Brygoo, E. R. & Richard, C. Pouvoir chromogène de *Malleomyces pseudomallei*. [**Chromogenic Properties of** *Malleomyces pseudomallei* (*Pf. whitmori*)] *Ann. Inst. Pasteur.* 1952, Dec., v. 83, No. 6, 822–5.

The following is a translation of the authors' summary :—

The production of pigment by *Malleomyces pseudomallei* [*Pf. whitmori*] is a contingent characteristic. The chromogenic property varies with the strain and the conditions of culture. Certain strains are able rapidly to produce a yellow water-soluble pigment. This pigment may be extracted from bacterial cells after hydrochloric acid hydrolysis. *H. J. O'D. Burke-Gaffney*

Courtois, G. & Limbos, P. Considérations à propos d'un cas d'Onyalai. [**Observations on a Case of Onyalai**] *Ann. Soc. Belge de Méd. Trop.* 1952, Oct. 31, v. 32, No. 5, 407–12. [22 refs.]

Erasmus, L. D. **Regional Tick Paralysis. Sensory and Motor Changes caused by a Male Tick, Genus** *Hyalomma*. *South African Med. J.* 1952, Dec. 13, v. 26, No. 50, 985–7. [28 refs.]

The case here reported is of interest for two reasons : one, that the tick involved, *Hyalomma transiens*, has not been known hitherto to cause tick paralysis in man ; and two, that the tick in this instance was a male.

The patient was a farm labourer, 21 years of age, who early one morning felt a burning pain from the right axilla to the elbow, and during the day this arm became weaker so that by the next morning he could hardly raise the arm and the hand-grip was feeble and there was numbness in the areas of the medial brachial and antebrachial cutaneous nerves. Finding a tick in his right axilla he snipped off the body and came to hospital ; he was by this time a little drowsy and still in considerable pain and all the muscles below the shoulder were weak and all sensation was lost below the shoulder, except for two small areas on the extensor aspect of the upper arm and forearm. Power was returning in the affected muscles in 2 days, pain was less and sensation was improving, though some degree of sensory loss persisted for 3 months. Muscle power had returned to normal in a week, those supplied by the radial nerve being the last to recover. Local inflammatory changes were observed in excised portions of the skin taken from the bitten site, but no gross changes in the nerve fibres.

H. Harold Scott

PROTOZOOLOGY : GENERAL

Jacobs, L., Melton, Marjorie L. & Jones, Frances E. **The Prevalence of Toxoplasmosis in Wild Pigeons.** *J. Parasitology.* 1952, Oct., v. 38, No. 5, 457–61. [18 refs.]

It is known that pigeons can be naturally infected with strains of *Toxoplasma* infective to mammals, and that they are themselves susceptible to mammalian strains of this parasite. Moreover two of the present authors have previously shown [this *Bulletin*, 1950, v. 47, 1229] that in pigeons experimentally infected with mammalian toxoplasms the parasites produced parasitaemia. In view of the close contact between pigeons and man it is therefore conceivable that these birds might serve as reservoirs of human infection transmitted by blood-sucking arthropods. In order to throw further light on this problem the authors investigated the incidence of natural toxoplasmosis among pigeons caught in

Washington. A total of 80 birds were examined by the dye-test and by inoculation of their tissues into mice. Positive results were obtained in 10 (12·5 per cent.), including 1 infection detected by both methods, 3 by mouse passage and 6 by the dye-test. On the whole, in 4 (5 per cent.) pigeons the infection was detected parasitologically and in 7 (8·8 per cent.) serologically. The presence of natural toxoplasmic infection in the mice inoculated from pigeons seems to be excluded, for spontaneous murine infection has never been found in the stock of mice used in these and other experiments. *C. A. Hoare*

Coutelen, F., Biguet, J., Doby, J.-M. & Deblock, St. Toxoplasmose des vertébrés poïkilothermes. Unicité ou pluralité des espèces de toxoplasmes. [**Toxoplasmosis of Cold-Blooded Animals : Unity or Plurality of Species of** *Toxoplasma*] *Bull. Soc. Path. Exot.* 1952, v. 45, No. 4, 539–46. [29 refs.]

The authors first review our knowledge regarding the relationship between the toxoplasms of mammals and birds, and conclude that the available data do not provide conclusive evidence of their specific identity. They then turn to a consideration of the toxoplasms of cold-blooded vertebrates, which have been recorded from 3 species of snakes, from one lizard, and one fish. Their relationship to the mammalian *Toxoplasma* was investigated by inoculation of ascitic fluid of mice, infected with a human strain and containing numerous parasites, into sticklebacks (abdominal cavity and muscles), toads, frogs and newts (peritoneum and dorsal lymph sacs), tortoises (subcutaneously and intramuscularly), lizards and snakes (intraperitoneally).

The results were in all cases negative. In fact the parasites disappeared from these animals within several hours after inoculation, as was demonstrated by examination of their fresh and stained tissues and body fluids, as well as of numerous histological sections. In addition, subinoculation of the teased-up tissues of the experimental animals into mice failed to infect the latter.

It was thus shown that cold-blood vertebrates were refractory to infection with a human strain of *Toxoplasma*, which was known to be infective to various rodents and birds. From these experiments it is concluded that cold-blooded vertebrates are either not susceptible to infection with toxoplasms, in which case the parasites previously described as such belong to other Coccidiomorphic Sporozoa, or they are infected with a distinct species of *Toxoplasma*, differing from the well-known *T. gondii* of warm-blooded animals. However, this problem can only be solved when the complete life-cycle and method of transmission of these parasites are known. *C. A. Hoare*

Kozar, Z. **Attempted Adaptation of Human Toxoplasma to Cold-Blooded Animals.** *Bull. State Inst. Marine & Trop. Med., Gdańsk, Poland.* 1952, v. 4, No. 1, 23–8. [Also in Polish 7–14 & in Russian 15–23.]

Among cold-blooded vertebrates natural infections with *Toxoplasma* have been recorded only from a snake, a lizard and a fish, but the relationship of these parasites to those found in warm-blooded animals is not known. In view of the possible epidemiological rôle of the lower vertebrates in toxoplasmosis, the author attempted to infect 73 frogs (*Rana esculenta*) with toxoplasms from mice infected with a virulent human strain. The infected material consisted of suspensions of mouse organs, excised portions of these, or peritoneal exudate, which were inoculated into frogs intraperitoneally, in the liver or in lymph spaces. The results were assessed by microscopical examination of stained smears and sections of the frog tissues, and by subinoculation of mice. The

experiments were made at room temperature (20°C.) and at temperatures approaching those of warm-blooded animals (up to 37°C.). The results were in all cases negative. *C. A. Hoare*

Kozar, Z., Wysocka, F. & Sikorska, S. **Studies concerning Peroral Infection with Toxoplasmosis.** *Bull. State Inst. Marine & Trop. Med., Gdańsk, Poland.* 1952, v. 4, No. 1, 37–9. [Also in Polish 29–33 & in Russian 33–7.]

Among the symptoms of toxoplasmosis, especially in adult human beings and in dogs, disorders of the alimentary tract accompanied by diarrhoea seem to indicate that the infection may be transmitted by the mouth. To test this possibility, the authors carried out two sets of experiments : one, on peroral infection of guineapigs ; the other, on the effect of human gastric juice on the virulence of toxoplasms.

In the first series, about 2 ml. of a 10 per cent. suspension of organs (spleen, liver) of infected mice were introduced by means of a catheter into the stomach of guineapigs. The results of inoculation were determined on the basis of pathological changes, microscopical examination of organ smears, subinoculation of mice with organ suspensions of the guineapigs, and serological reactions. Out of 20 inoculated guineapigs, toxoplasmic infection was detected in 10, while one was doubtful, and 9 failed to acquire an infection. It has thus been demonstrated that guineapigs can be infected with toxoplasms *per os*, but the duration of the infection (7–19 days) is longer than in the case of experimental infections produced through other routes (6–9 days).

For experiments with human gastric juice, 20 samples were taken, varying from achylous to hyper-acid juices. Material infected with toxoplasms was exposed to the action of the juices for periods from a half to one hour, after which 0·2 ml. was injected subcutaneously into mice, while control mice were inoculated with infective material kept in saline. It was found that survival time increased with the acidity of the gastric juice, measured by the content of free HCl, indicating that the latter impaired the virulence of the parasites. From these experiments it is concluded that toxoplasmosis can be transmitted *per os*, but infection by this route is not always effective. However, the possibility of human infection through the meat or milk of infected animals, as well as by contamination of food with the faeces and urine of such animals, cannot be excluded. *C. A. Hoare*

Westphal, A. & Palm, Gerda. Fehlerquellen des direkten Parasitennachweises bei Toxoplasmainfektionen. [**Fallacies in the Parasitological Diagnosis of Toxoplasmosis**] *Ztschr. f. Tropenmed. u. Parasit.* Stuttgart. 1952, May, v. 3, No. 4, 486–92, 4 figs.

The parasitological diagnosis of toxoplasmosis can be made by examination of various body-fluids and excreta, such as the cerebrospinal fluid and urine. For this purpose, the fluid is sometimes allowed to stand for one day, after which the sediment is spread on a slide into a thick film and stained by Giemsa's method. It has been claimed that this method reveals a high proportion of toxoplasms. However, by re-staining such preparations by Gram's method, the author has demonstrated in them Gram-positive bodies which have been identified as fungoid organisms, especially yeasts, which had contaminated the fluid. In order to avoid this source of fallacy in the parasitological diagnosis of toxoplasmosis, fresh cerebrospinal fluid should be concentrated by centrifugation for about 20 minutes at 1,000 revolutions per minute, after which the sediment is spread in thin smears, dried and fixed with methyl alcohol, and stained by

Giemsa's method. In such preparations the toxoplasms can be readily identified by the blue colour of the cytoplasm and the red-staining nucleus. The various appearances are shown in 12 photomicrographs. *C. A. Hoare*

KABELITZ, H. J. Das Toxoplasma gondii im Sternalpunktat. [*Toxoplasma gondii* **in Material from Sternal Puncture**] *Klin. Woch.* 1952, Jan. 15, v. 30, Nos. 3/4, 74–6, 2 figs. [10 refs.]

The author records the finding, in material obtained by sternal puncture from 4 patients, of nests (pseudocysts) of parasites resembling toxoplasms. Serological tests (complement-fixation and dye-test) were positive in 3 of the patients. The appearances of these " nests " in 2 cases is shown in photomicrographs. *C. A. Hoare*

HUMPHRIES, J. M. & GRULEE, C. G., Jr. **Toxoplasmosis. Methylene-Blue Dye Tests and Mouse-Antigen Skin Test in One Hundred Two Hospitalized Children.** *Amer. J. Dis. Children.* 1952, Nov., v. 84, No. 5, 580–86.

During 1950 and 1951 the blood sera of about 100 infants and children in the clinics and wards of the Charity Hospital of Louisiana, none of whom was suspected of having toxoplasmosis, were submitted for examination by the methylene-blue dye test (Sabin-Feldman test) as part of a national survey concerning the incidence of toxoplasmosis conducted by Dr. Feldman. The results of the study showed that in the 0–4 year age-group 15 per cent. gave a positive titre of 1 : 4 or higher, in the 5–9 year group the percentage of positives was 33 per cent. and in the 10–15-year-olds 35 per cent. of positives were found. Skin tests were performed on 41 children and dermal sensitivity was found in 7 per cent. of the youngest and 83 per cent. of the highest age-group, but a " disturbing lack of correlation between the two tests exists ".

These results are discussed. It is considered that the tests are of limited diagnostic value but it is also stated in the conclusions " The data suggest either that there is an asymptomatic form of the disease in children, whether infection is acquired congenitally or postnatally, or that the antibodies measured by the methylene-blue dye test are not highly specific. The first possibility is favored." *M. E. Delafield*

SIIM, J. C. **Acquired Toxoplasmosis. Report of Seven Cases with Strongly Positive Serologic Reactions.** *J. Amer. Med. Ass.* 1951, Dec. 22, v. 147, No. 17, 1641–5.

Toxoplasmosis is frequently demonstrated in newly-born infants whose mothers, though showing positive serological reactions, show no other evidence of the disease. The disease has also been reported in adults both in severe and fatal and in mildly symptomatic forms. Finally, a material proportion of persons in normal health show positive serological reactions, so that is probable that infection with this protozoon is far more common than the overt disease.

The author has already demonstrated a case of generalized lymphadenitis with fever in which the serological reaction for toxoplasmosis was high. The present study was undertaken with the object of obtaining a clearer clinical picture of mild toxoplasmosis.

For this purpose he carried out serological tests in a number of persons, including several with pyrexia of unknown origin. The complement-fixation

test and the dye test were significantly positive in 7 persons, 5 of whom were members of 2 families. The most constant clinical finding was generalized adenopathy, not noticed by the patient. Firm, discrete and painless glands were found in the groins, axillae and neck in most cases, but enlarged occipital and hilar glands were also encountered. No splenic enlargement was noted. The other signs and symptoms encountered were marked but unexplained lassitude, raised temperature, catarrhal symptoms, and persistent mucous diarrhoea. In one patient there was some lung infiltration. Total leucocyte counts were normal except in one case, and in this the erythrocyte sedimentation rate was raised. In 5 cases the lymphocyte count was raised or was at least on the high side and in 2 there was eosinophilia. Attempts to demonstrate toxoplasma in the lymphatic glands failed.

The dye test titre varied from 1 in 800 to 1 in 6,250 and in only one case was it less than 1 in 1,250. The titre showed a falling tendency in several cases and in one it increased at first and fell later but not below 1 in 800. The complement-fixation test titre was 1 in 128 in 6 cases and 1 in 64 in one case.

The Wassermann and Paul-Bunnell reactions were negative in all cases.

L. E. Napier

Meira, J. A., Nobrega, P. & Neto, V. A. Toxoplasmose adquirida (forma febril exantemática). Considerações clínicas sôbre um caso observado em adulto e diagnosticado pelas provas sorológicas. Efeito terapêutico do cloranfenicol. [**Acquired Toxoplasmosis (Exanthematic Febrile Form). Clinical Observations on an Adult Case Diagnosed Serologically. Therapeutic Effect of Chloramphenicol**] Reprinted from *Rev. Hosp. das Clín.* 1952, Oct., v. 7, No. 4, 265–90, 2 figs. [41 refs.] English summary.

The case reported was in a man of 32 in São Paulo, Brazil. The course was febrile and symptoms disappeared after a total dosage of 53 gm. chloramphenicol in 23 days. The diagnosis was made from positive complement-fixation and dye tests.

Müller, F. Angeborene und erworbene Toxoplasmose des Sehorgans. [**Congenital and Acquired Ocular Toxoplasmosis**] *Ztschr. f. ärztl. Fortbildung.* 1952, Nov. 1, v. 46, No. 21, 630–35, 3 figs. [53 refs.]

In this clinical article from the ophthalmic clinic of the University of Leipzig the subject of ocular toxoplasmosis is introduced by a summary of the history of the disease, the characters of the causative protozoon, its spread, the serological tests and the signs and symptoms of the infection. More fully described are the congenital defects to which maternal toxoplasmosis gives rise in infants, with special reference to eye conditions. Much of the paper deals with the retinitis and other changes found in the adult in chronic and acute forms of the disease. Differential diagnosis is discussed as, for example, that the appearance of the retina may suggest sarcoma ; this points to the importance, in such cases, of carrying out a serum test which, though not entirely satisfactory, may place doubt on the diagnosis of sarcoma and so prevent an unnecessary enucleation. Treatment is unsatisfactory but some authors have recorded good results in active ocular disease with sulphonamide therapy. In one instance sulphathiazole was given with good results in a daily dose of 9·0 gm. for 1 week, repeated each month during the last 5 months of the pregnancy of an infected woman. Other observers have combined sulphonamide treatment with fever therapy. It may be worth while to give sulphonamide treatment to pregnant women in whom the disease appears to have been arrested in the hope of preventing the lighting up of the disease and its transmission to the foetus.

M. E. Delafield

PRAY, E. G. **The Effects of Various Bacteria and their Metabolites on Growth of *Trichomonas vaginalis in Vitro*.** *J. Parasitology*. 1952, Oct., v. 38, No. 5, 398–408, 3 figs. [22 refs.]

The effect of bacteria on the growth of *Trichomonas vaginalis in vitro* was studied by adding cultures of various species of bacteria (grown on Difco agar) to bacteria-free cultures of the flagellate (grown in SHAFFER, RYDEN and FRYE's liquid thioglycollate medium [this *Bulletin*, 1949, v. 46, 634] or SPRINCE and KUPFERBERG's trypticase medium (*J. Bact.*, 1947, v. 53, 435). The effect of bacterial metabolites was tested with filtrates of bacterial cultures grown in trypticase medium.

The results of these trials were as follows. *Bact. coli*, *Bact. aerogenes*, *Pseudomonas pyocyanea*, *Salmonella paratyphi B.*, *Salm. paratyphi A* and *Proteus mirabilis* greatly inhibited multiplication of the flagellate and shortened the life of the culture, while *Brucella suis*, *Streptococcus lactis*, *Pseudomonas fluorescens*, *Bact. alcaligenes*, *Sarcina lutea* and *Bacillus subtilis* had only a slight inhibitory effect on multiplication but always reduced the life of the culture. Finally, *Staphylococcus aureus* and *S. albus* prolonged the life of the culture for longer periods than that of pure cultures of *T. vaginalis*, though the population of flagellates never exceeded the latter.

Changes in *p*H and oxidation-reduction potential, which were determined by a Beckman Meter, were not correlated with the effect of bacteria on the growth of the flagellates. Likewise, there was no evidence that filtrates of bacterial cultures were responsible for the effects observed.

Nutritional studies were carried out by enriching the cultures of flagellates and bacteria with additional amounts of the ingredients of the trypticase medium (serum, vitamin B complex, amino-acids, purines and pyrimidines, choline Cl and inositol, biotin and folic acid, and maltose). Maltose proved to be the most important factor in promoting growth of *T. vaginalis*, but addition of glucose was just as effective. *C. A. Hoare*

ENTOMOLOGY AND INSECTICIDES : GENERAL

[Papers on the toxic effects of insecticides in man are abstracted in the *Bulletin of Hygiene* under the general heading of Occupational Hygiene and Toxicology.]

SERFLING, R. E. **Entomological Survey Methods.** *Pub. Health Rep.* Wash. 1952, Oct., v. 67, No. 10, 1020–25, 3 figs.

Collection methods are discussed very broadly with brief mention of such equipment as baited and other traps, dippers for mosquito larvae, flannel strips for ticks and Scudder's grill for flies.

Three types of entomological survey are mentioned, first, the exploratory, in which the choice of method depends on the entomologist's knowledge of the insect and the ecology of the area to be surveyed ; the second type is that which is planned to provide information for control purposes and to appraise the effectiveness of the control operations, and the third takes the form of an epidemiological field study. The second and third types are illustrated by very brief references to actual house-fly studies.

The reader is then reminded that the recorded results are influenced by many variables and that any statistics used to describe the findings should be capable of being understood by all those connected with or who have an interest in the work. These remarks apply also to the presentation of the results of any planned experiments which it may be found necessary to make. *H. S. Leeson*

SASA, M. & NAKAHASHI, Y. **A New Species of the *Aedes*(*Finlaya*) *niveus* Subgroup of Mosquito from Japan.** *Japanese J. Exper. Med.* 1952, June, v. 22, No. 3, 257–65, 8 figs.

ARMSTRONG, G., BRADBURY, F. R. & BRITTON, H. G. **The Penetration of the Insect Cuticle by DDT and Related Compounds.** *Ann. Applied Biol.* 1952, Dec., v. 39, No. 4, 548–56, 2 figs. [12 refs.]

These experiments were performed with the grain weevil, but reference is made to the work of BARLOW and HADAWAY [this *Bulletin*, 1952, v. 49, 557] and HADAWAY and BARLOW [*ibid.*, 1951, v. 48, 1053] on mosquitoes and tsetse flies and on the sorption of insecticides by dried mud.

MAIER, P. P.; BAKER, W. C.; BOGUE, M. D.; KILPATRICK, J. W.; QUARTERMAN, K. D. **Field Studies on the Resting Habits of Flies in relation to Chemical Control. Part I—In Urban Areas** [MAIER, BAKER, BOGUE, KILPATRICK & QUARTERMAN]. *Amer. J. Trop. Med. & Hyg.* 1952, Nov., v. 1, No. 6, 1020–25. **Part II—In Rural Areas** [KILPATRICK & QUARTERMAN]. *Ibid.*, 1026–31.

These observations were made in the southern States of the U.S.A. (Savannah, one of the sites, is near latitude 32°N.) during spring and summer months. The minimum temperatures recorded ranged from 41° to 74°F. and the maxima from 63° to 97°F. It seems that a considerable proportion of dwelling houses were more or less protected by fly screens, which altered the distribution of fly resting places. The method of the investigation was to make regular inspections of buildings, vegetation and other possible fly resting-places, once before dawn, at 6 intervals during the day and once after dark. The species most commonly encountered were: *Musca domestica*, various flesh flies such as *Sarcophaga*, *Lucilia*, etc., and the fruit flies *Drosophila* spp.

In urban areas, it was found that ground surfaces and scattered garbage were the principal day-time resting places of nearly all the flies observed. Few observations were made in dwelling houses because these were mostly screened and flies were rare in them; but inspections of miscellaneous unscreened outbuildings revealed few flies.

At night, the flies in these urban districts were mainly found on tree twigs, bushes, weeds and other vegetation, also on ropes and wires, especially if sheltered. Very few remained on the ground.

Flies of the genus *Drosophila* were exceptions to the above generalizations. They were most common in privy pits during the day and on privy ceilings at night. Since these flies are often attracted to foods eaten raw, their presence in privies suggests that they may sometimes act as disease vectors.

Rather different habits were revealed for flies in country districts because many of the houses were not screened. Consequently, a considerable proportion of the flies observed during the day were found resting inside houses. Most of the remainder were found on the ground, as before (especially in animal pens and on or near refuse). At night, the numbers inside houses increased at the expense of the ground sites. The flies tended to rest on ceilings of rooms and on the upper parts of the walls.

The authors conclude that, particularly in areas where most houses are screened, fly-control insecticides should be sprayed over vegetation in the neighbourhood of buildings as well as inside houses. Even so, the chances of flies resting on sprayable surfaces during the day is only 11 per cent. in areas with screened buildings and 21 per cent. with unscreened buildings. Screening itself seems to be very desirable, since it is claimed to be 97 per cent. efficient in excluding flies. *J. R. Busvine*

Quarterman, K. D. & Mathis, W. **Field Studies on the Use of Insecticides to control Fly Breeding in Garbage Cans.** *Amer. J. Trop. Med. & Hyg.* 1952, Nov., v. 1, No. 6, 1032–7.

Earlier work had established that dustbins are the principal source of fly breeding in Savannah, Georgia, U.S.A. The most prevalent species emerging from these dustbins was *Musca domestica* which, with various other flies, was found to breed in sludge at the bottom of the bin. An interesting biological observation was the fact that several of the flies, including *M. domestica*, continued to emerge sporadically from dustbins throughout the winter 1950–51, during which there were numerous cold spells with minimum temperatures as low as 15°F. Emergence frequently occurred on days when the minimum temperature was well below freezing, 21°F. being the lowest. [Temperature in the bins, and particularly in the sludge, would be higher owing to putrefactive fermentation.]

The effectiveness of various insecticides for suppressing fly breeding was investigated by treating groups of bins with aqueous emulsions of the insecticides and capturing the flies emerging at intervals of one or two weeks after treatment. In 1950, technical BHC (200 mgm./sq. ft.) *gamma* BHC (50 mgm. /sq. ft.) and dieldrin (25 mgm./sq. ft.) gave the best results. Chlordane (200 mgm./sq. ft.) was ineffective. In 1951, BHC and dieldrin had become relatively less effective (possibly because of development of insecticide-resistance) and the best control was obtained with paradichlorbenzene crystals (2 oz. per bin). *J. R. Busvine*

Mackerras, I. M. & Mackerras, M. J. **Notes on Australasian Simuliidae (Diptera). III.** Reprinted from *Proc. Linnean Soc. of New South Wales.* 1952, v. 77, Pts. 3/4, 104–13, 25 figs.

Vargas, L. & Díaz Nájera, A. *Phlebotomus beltrani* n. sp. y *Phlebotomus wirthi* n. sp. del Estado de Veracruz (Diptera : Psychodidae). [*Phlebotomus beltrani* **n. sp. and** *P. wirthi* **n. sp. in the State of Veracruz**] *Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1951, Jan.–Dec., v. 12, Nos. 1/4, 101–6, 4 figs. English summary.

Tendeiro, J. Ixodídeos da Guiné Portuguesa. Chaves para a identificação das carraças guineenses. Listas de hospedeiros e de espécies. [**Ixodidae of Portuguese Guinea. Keys for Identification of Ticks of Guinea. List of Hosts and Species**] *Anais Inst. Med. Trop.* Lisbon. 1952, Mar., v. 9, No. 1, 195–263, numerous figs. [42 refs.] English summary.

Lamb, K. P. **The Tropical Rat Mite,** *Bdellonyssus bacoti* **(Hirst, 1913) attacking Man in New Zealand.** *New Zealand Med. J.* 1952, Oct., v. 51, No. 285, 320–22, 1 fig. [14 refs.]

Office workers in Auckland were bitten by *Bdellonyssus bacoti* which began to be troublesome a few days after rats had been destroyed by cyanide fumigation. A few previous records of this mite irritating man in different premises in Auckland and Dunedin since 1946 are also noted. The rôle of this mite as a natural vector of rickettsiae in man is briefly discussed, with the conclusion that its importance cannot yet be properly assessed. Kerosene sprays [it is not clear if these contained DDT or pyrethrum] were " moderately successful " in controlling the mite in an Auckland building. Elsewhere it is noted that effective control followed use of a dust (5 per cent. DDT ; 50 per cent. sulphur ; diluent ?).

There is a figure of the female mite (ventral aspect), and a detailed description of it in the text. *D. S. Bertram*

i. Incho, H. H. & Greenberg, H. **Synergistic Effect of Piperonyl Butoxide with the Active Principles of Pyrethrum and with Allethrolone Esters of Chrysanthemum Acids.** *J. Econom. Entom.* 1952, Oct., v. 45, No. 5, 794–9, 5 figs. [18 refs.]

ii. Gersdorff, W. A. & Mitlin, N. **Relative Toxicity of Furethrin, its Natural Acid Isomer, and Pyrethrins to House Flies.** *Ibid.* 849–50.

These two papers record laboratory tests of new synthetic compounds of the pyrethrin type. The test insects used were house-flies (*Musca domestica*) and the method employed was determination of median lethal concentrations with a Campbell turntable apparatus. [It should be pointed out that both the test insect and the technique are favourable to these synthetic insecticides. With other methods and other insects, the natural pyrethrins generally tend to be considerably superior.]

i. The authors have investigated the synergistic effects of 10 times the concentration of piperonyl butoxide on (*a*) natural pyrethrum mixture, (*b*) constituents of natural pyrethrum, and (*c*) various partly or wholly synthetic analogues. The results were judged on the relative lowering of the median lethal concentration by addition of the synergist. It was found that the natural product benefited most by the synergist, more even than a mixture of its components in a ratio believed normal. Of the components, the cinerins were more synergized than the pyrethrins. None of the synthetic or partly synthetic compounds was improved to the extent of the natural pyrethrins. (The potencies of the various samples were increased by the synergist as follows: natural pyrethrum mixture, ×15: pyrethrin I or pyrethrin II, ×9: cinerin I, ×14: cinerin II, ×12; synthetic compounds, from ×2·3 to ×4·3.)

ii. A recently prepared analogue of allethrin contains a furfuryl group in the side chain of the cyclopentenolone component. This ester has been named furethrin. A refined sample of this compound was found to be as toxic to house-flies as a natural pyrethrin mixture and one-third as toxic as allethrin. Furethrin and its *d-trans* acid (*i.e.*, only partly synthetic) isomer both had good knock-down effects on the flies. *J. R. Busvine*

Barbier, P., Rumpf, P. & Muterel, A. Étude comparative de l'activité insecticide de quelques dérivés du diphényléthane et de la méthylphénylsulfone. [**Comparative Study of the Insecticidal Action of Some Derivatives of Diphenylethane and of Methylphenyl-Sulphone**] *Bull. Soc. Chimie Biol.* 1952, v. 34, No. 10, 1005–15, 1 fig. & 1 diagram. [16 refs.]

Naqvi, S. H. **The Effect and Influence of Modern Insecticides on Insect-Borne Diseases.** *Pakistan J. of Health.* 1952, Oct., v. 2, No. 3, 203–14. [31 refs.]

A general review and discussion.

LABORATORY PROCEDURES

Chakravarty, R. K. **Modified Leishman's Stain without Methyl Alcohol.** *Indian Med. Gaz.* 1952, Sept., v. 87, No. 9, 404–5.

Reference has already been made to the difficulty in obtaining sufficient methyl alcohol in India and Ghosh and Das Gupta have reported satisfactory results with the use of absolute ethyl alcohol as a solvent in preparing Leishman's stain [this *Bulletin*, 1953, v. 50, 72].

The present author, after a year's experience, has obtained as good results with absolute alcohol (dehydrated ethyl alcohol) in staining blood cells and malaria parasites by a modified Leishman's stain as he had with the standard stain.

He mentions certain precautions and modifications. The importance of using good quality absolute alcohol is stressed. Some brands of absolute alcohol contain aldehyde and even free acid which interfere with staining. As the free acid usually results from oxidation of aldehyde it is only necessary to test for the latter. This is done by adding 1 vol. of 20 per cent. (w/v) sodium hydroxide to 2 volumes of absolute alcohol : a yellow-brown colour indicates the presence of aldehyde.

Furthermore, fixation of smears takes longer with absolute than with methyl alcohol and the chances of evaporation are therefore greater, so preparations should be covered.

The author finds that the use of 200 mgm. of Leishman powder per 100 cc. absolute alcohol gives the best results. Otherwise, the method is on the same lines as the standard Leishman staining. The stain, in a tightly stoppered bottle, should be kept at 37°C. for 24–48 hours before use.

In staining, the undiluted—and later the diluted—stain should act for 5 minutes. *H. J. O'D. Burke-Gaffney*

REPORTS, SURVEYS AND MISCELLANEOUS PAPERS

GIROLAMI, M. Considerazioni mediche su un viaggio nello Yemen. [**Health Considerations on a Voyage through the Yemen**] *Arch. Ital. Sci. Med. Trop. e Parassit.* 1952, July, v. 33, No. 7, 355–405, 21 figs. & 1 map. [10 refs.]

In the early part of 1952 Girolami, who is director at the Tropical Diseases Hospital, Rome, was asked to go to the Yemen (*Arabia Felix* of the Ancients) and treat the King. The visit which was to last 2–3 weeks became extended to over 7 weeks, in the course of which the author carried out, at the King's request, a health survey of the country of which this paper is an account. He writes of what he has himself seen and quotes from the reports, published or otherwise, of other investigations and observers including the Commission of the U.S. Naval Medical Research Unit No. 3 (1951), PETRIE, and Italian, French and other British doctors who have worked in or visited the country. Girolami has looked into the hospitals, and their work and future plans, at Sanaa, Faiz and Hodeida and thinks that further good work will and can be done at these institutions.

The prevalent diseases met with are those with which we are already familiar in tropical Africa and the Middle East. *Anopheles* species include *A. dthali*, *A. gambiae*, *A. adenensis*, *A. turkhudi*, *A. cinereus*, *A. sergenti*, *A. pretoriensis* and *A. pharoensis* [see also BUXTON, this *Bulletin*, 1945, v. 42, 335].

Thanks to a keen and intelligent administration, and the help and advice of sanitary missions from the Italian and French Governments, a beginning has been made with sanitary measures at certain main centres.

Water supply is often drawn up in skin buckets from deep wells. Faiz has a supply, derived from springs at an altitude of over 3,000 feet, which was until recently distributed only by open gutter at ground level. A piped mains service from the same source has now been completed to serve the hospital

and certain quarters of the City, and another scheme from a different set of high springs was in course of construction and to be completed in October, 1952.

No service has yet been developed for public cleansing, and vultures and numerous stray dogs remain the usual agents for disposal of refuse.

This very comprehensive account by a medical expert contains much information about the chewing of *khat* (the leaves of *Catha edulis*) to which there is widespread addiction in the country. The habit gives rise to a sensation of warmth followed by sweating and thirst ; hence the drinking of large quantities of water when chewing these leaves. They produce a sharpening of intelligence and memory, counteract fatigue and hunger and lead to a feeling of well-being and cheerfulness and give a " rosy " appearance to all one's surroundings. Later there is a rise in body temperature and a quickening of the pulse rate, to be followed by a drop in both. There may be insomnia, constipation and loss of seminal fluid with the urine. Unlike *coca* leaves or *hashish*, addiction to *khat* does not seem to produce any hallucinations. [See also this *Bulletin*, 1945, v. 42, 658, 659.]

Girolami's paper has interesting information on the subject of *kisr*—a hot infusion which is made from the dry husks of coffee beans and which is drunk all through the day by everybody. Its action is said to resemble that of tea rather than coffee.

There is given much other information which is no less fascinating for not being of a medical or health nature. The tour included a visit to Sheba.

The author advises that the necessary surveys should precede preventive measures and recommends that (1) the population should be educated in the elements of practical hygiene (through the schools, at open air meetings and perhaps in the mosques) ; (2) the ablution facilities at the mosques (the present methods are believed responsible for the spread of schistosomiasis and certain other diseases) should be modernized ; (3) water supplies should be improved ; (4) measures should be instituted against mosquitoes and house-flies ; and (5) food handling should be made more hygienic. *J. Cauchi*

Annual Midwestern Conference of Parasitologists (A.M.C.O.P.). **Preliminary Check-List of Parasitic Cultures on Exchange Program of Annual Midwestern Conference of Parasitologists (A.M.C.O.P.).** 1952, July 20, 33 mimeographed pp.

In 1949 the Laboratory Animals Bureau of the Medical Research Council (London) issued a cyclostyled " Catalogue of Arthropods, Helminths, Molluscs and Protozoa of Interest to Medical and Veterinary Workers " which gave information about collections of these organisms maintained at institutes in the United Kingdom [see this *Bulletin*, 1949, v. 46, 981].

A somewhat similar check-list of Laboratories in the " Midwestern " U.S.A., where cultures of protozoa, helminths, molluscs, insects and vector-borne microbial pathogens are maintained, has been compiled by a Committee of the Annual Midwestern Conference of Parasitologists (A.M.C.O.P.) and issued in cyclostyled form as a preliminary to a definitive list which it is hoped to publish later.

Forty-two laboratories have supplied particulars of the cultures they maintain. These particulars include the history of the strains, how the strains are maintained, mode of transmission, frequency of transfer, and further notes of value. The cultures include 50 species of protozoa, 23 species of helminths, 12 species of molluscs, 41 species of arthropods, and 12 species of micro-organisms (bacteria, rickettsiae, viruses, etc.), and for each species all the

laboratories maintaining the cultures are listed, with their complete addresses, and the names of the persons to whom application for cultures should be made.

It is not intended to restrict the list to the midwestern U.S.A., and other laboratories willing to cooperate in an exchange programme are invited to send data of their parasitic cultures to Dr. H. Elishewitz, Secretary of the Committee on Exchange of Culture Materials, (A.M.C.O.P.), Chicago Medical School, 710 S. Wolcott Avenue, Chicago 12, Illinois. *R. L. Sheppard*

DE AZEVEDO, J. F. **The Anglo-Portuguese Contribution to Tropical Medicine.** *Anais Inst. Med. Trop.* Lisbon. 1951, Dec., v. 8, No. 4, 689–721, 13 figs. [23 refs.]

In this lecture, delivered at the British Institute, Lisbon, on May 2, 1951, the author gives a short account of the growth of knowledge of tropical diseases from the 15th century with special reference to the part taken by Portuguese and British investigators in this advance. Brief biographical notes and portraits of men distinguished by their important discoveries are given and the schools of tropical medicine at Lisbon, Liverpool and London and in Portuguese and British territories, as well as international congresses for promoting collaboration and exchange of knowledge, are referred to. *J. F. Corson*

BOOK REVIEWS

UNITED KINGDOM. **History of the Second World War. Medicine and Pathology** [Edited by V. Zachary COPE, M.D., M.S. (Lond.), F.R.C.S.] with a General Preface to the Series by the Editor-in-Chief [Sir Arthur S. MACNALTY]. pp. xxix+565, 1 pl., 5 charts, 6 graphs & 2 figs. 1952. London : H.M. Stationery Office. [50*s*.] [This review appears also in the *Bulletin of Hygiene*]

This is the first of eighteen volumes designed to cover medical aspects of the Second World War. In 33 chapters a number of distinguished contributors deal authoritatively with aspects of medicine and pathology of which they had special experience between 1938 and 1945, years during which, for the first time in history, military medical advisers came into their own and high executive officers gave ear to their warnings and advice. The louse, the mosquito and the mite were in turn rendered innocuous to the advancing allied armies. Sir Henry TIDY, in the introductory chapter states that " the advances in the cure and suppression of malaria were the most important contributions to medicine during and as the outcome of the war".

The introduction is followed by three essays on Medicine in the Navy, Army and Air Force written by senior consultants in these services and by one on " Medicine in the Emergency Medical Services " written, in collaboration with Professor de WESSELOW, by Sir Arthur MacNalty, the distinguished General Editor of the whole series.

General medical problems concerning wastage of manpower at the time of recruitment, during training and on service are dealt with in chapters on

Dyspepsia, Cardiology, Rheumatic Diseases, Venereal Diseases and Dermatology. Over fifty pages are devoted to wartime aspects of psychiatry. They demonstrate the important parts played by psychiatrists and psychologists in making the best of, often, second or third-rate human material, of fitting round pegs into round holes and of the value of early and accurate assessment of psychiatric disabilities.

Two most interesting sections deal with the special hazards and problems of sea warfare : " The Results of Exposure After Shipwreck and the Like " by MacDonald CRITCHLEY and " The Hazards of Toxic Gases in Warships " by Surgeon Commander ELLIS. An excellent chapter deals with the clinical and epidemiological aspects of Infective Hepatitis, the complex symptomatology and serious sequelae of which, were unsuspected before the war.

J. S. K. BOYD contributes an outstanding chapter on " Advances in Tropical Medicine". Mosquito control ; the story of Hamilton FAIRLEY's work at Land Headquarters Medical Research Unit A.I.F. at Cairns, where it was proved that one mepacrine pill a day would enable troops to operate unscathed in malarious jungles ; the problems of leishmaniasis, trypanosomiasis, plague, cholera, relapsing fever, scrub typhus, dengue and sandfly fevers, schistosomiasis, sprue and amoebiasis are briefly surveyed and the spectacular advances in the conquest of bacillary dysentery as a desert scourge—in which Boyd played a prominent part—are modestly narrated.

Several of the subjects included in Boyd's summary are dealt with in detail by other contributors. " The Typhus Fevers " by C. H. ANDREWES is a fascinating account of successful intensive *ad hoc* research in the face of odds and against time. The production of rickettsial vaccine on eggs, in the lungs of mice and in rabbits ; studies on the antigenic structure of rickettsiae, the application of insecticides and the successes attained in coping with the unexpected problem of mite typhus in South-East Asia are well described.

The chapter on Neurology includes the " neurological complications of relapsing fever and typhus fevers", " shoulder girdle neuritis", which appeared in the Middle and Far East during the war as a new clinical entity, and " the neurological effects of heatstroke " as well as an important survey by J. D. SPILLANE of " nutritional disorders of the nervous system in prisoners of war "—including Wernicke's encephalopathy, retrobulbar neuritis, spastic paraplegia and quadriplegia.

Eight pages only are devoted to a masterly survey of research on " Medical Entomology and Insecticides " by P. A. BUXTON who deals, all too briefly, with the victorious fight for mastery over lice, sarcoptes, typhus mites and mosquitoes. The effect produced by workers in this field on the availability of manpower on all fronts deserved a larger chapter.

The world wide importance of febrile illnesses accompanied by transient and shifting X-ray shadows in the lungs is well dealt with in a chapter on " Primary Atypical Pneumonia " by S. P. BEDSON. " Tetanus in the War ", a problem of diminishing importance owing to the availability of active immunization, is covered by a contribution from L. COLE, L. C. MARTIN and J. S. K. BOYD. " Hospital Infection and Airborne Spread of Infection ", subjects worthy of close study by hospital administrators in all parts of the world, are presented in an interesting way by A. A. MILES and R. E. O. WILLIAMS. " Smallpox " by A. W. DOWNIE and " Influenza " by C. H. ANDREWES are of interest to clinician and hygienist alike. The scientific investigation of food poisoning which increased in prevalence in Britain owing to the growing custom of mass feeding on made-up dishes in canteens is the subject of an article by V. D. ALLISON.

Chapters on " The Pneumococcus " by Wilson SMITH : " The Staphylococcus" by F. C. O. VALENTINE ; *Streptococcus pyogenes* by S. D. ELLIOTT and on

"Leptospirosis" by A. D. GARDNER draw attention to wartime advances in the field of bacteriology.

The final chapter on "Penicillin" by L. P. GARROD traces the development of penicillin therapy from its early primitive crude production at Oxford to its full development as a weapon against disease in both fighting troops and civilians. That "Florey visited the United States of America and persuaded the authorities there to undertake the commercial production of penicillin" is one of the most important facts of recent medical history. Professor Garrod's reminder that some believed that the withholding of publication of facts about the production and use of penicillin so that the wounds of the enemy would continue to fester "would presumably have been viewed with extreme disfavour by Hippocrates" will touch a sympathetic chord in the minds of many who have taken the Hippocratic oath.

This book will have a wide appeal to many in temperate climes but it is of outstanding interest to workers in tropical medicine and hygiene. It should be noted, however, that it is a historical work dealing with the period ending in 1945. The sweeping advances in therapeutics in the past five years are, naturally, not to be found within its pages. *George R. McRobert*

HANDBUCH DER INNEREN MEDIZIN. 4. Auf. Herausgegeben von G. v. BERGMANN, W. FREY u. H. SCHWIEGK. Bd. 1. **Infektionskrankheiten.** [Infectious Diseases] 1. Teil. pp. xvii+1536, 417 figs. (some in colours). 2. Teil. pp. xv+1225, 293 figs. (some in colours). 1952. Berlin. Göttingen. Heidelberg: Springer-Verlag. [Price DM. 374.]

The great *Handbuch der Inneren Medizin* is starting to appear in its 4th edition. The first two volumes are devoted to infectious diseases and form what must be the most up-to-date encyclopaedic account of this group of human afflictions. They weigh 11 pounds and have 2,761 pages between them. They are lavishly and in most instances beautifully illustrated with 710 charts and photographs, many of them coloured. The only subjects omitted or not fully dealt with are endemic hepatitis, pneumonia, tuberculosis and herpes, encephalitis and meningitis. The editors intend to deal with them in future volumes on diseases of the digestive tract, of the respiratory organs and of the nervous system respectively. At the end of the second volume is a subject index of 45 pages dealing with some 7,000 items and an author index of 160 pages listing some 25,000 names. The contributions are by many well known authors, nearly as many Swiss as German which bears witness to the debt German medicine owes to Switzerland for carrying on the great tradition through troubled years.

The first volume starts with 100 pages on general epidemiology by SCHLOSSBERGER and ECKART (Frankfurt). More than 10 pages are devoted to some 500 references. This is symbolic of the thoroughness with which each subject is dealt with in turn and of the extent to which this work aims at being both a text book and a bibliography. Thus the chapters on the rickettsial fevers occupy 123 pages, 32 of which are filled with closely printed references.

GLANZMANN (Berne) deals with measles, scarlet fever, rubella, and each chapter is illustrated with excellent colour photographs of the specific eruption. The "fourth disease" of Filatow and Dukes is briefly dealt with and considered to represent mild scarlet fever or possibly rubella. The "fifth disease" (erythema infectiosum) and exanthema subitum are discussed in detail and following on are chapters on chickenpox and sweating sickness (febris miliaris). HÖRING (Worms) writes on smallpox, and KLEINSCHMIDT (Göttingen) on mumps. MASSINI and BAUER (Basle) contribute 100 pages on influenza

(20 pages of references) and a chapter each on the common cold and herpes simplex. Virus encephalitis is dealt with by LÖFFLER and LÜTHY (Zurich). They devote most of their contribution to Economo's disease, but they also deal with other infections. St. Louis and Japanese encephalitis, Western, Eastern and Venezuela equinine encephalitis and Russian *Ixodes*-transmitted encephalitis are all discussed. The virus infections which affect the nervous system of laboratory animals, but not of man, are briefly mentioned (West Nile, Bwamba, Semliki Forest and Bunyamwera disease from Africa, Ilheus, Columbia and California mosquito-borne virus from the Americas). An account is given of the demyelinizing forms (leukencephalitis) which affect the white matter of the brain especially. These diseases strikingly resemble conditions produced recently in laboratory animals by Payling WRIGHT and THOMPSON by the administration of anticholinesterases, but this work has only recently been published and cannot have been available to the authors. A beautifully written chapter on poliomyelitis and related virus diseases (Bornholm disease, louping ill) is the contribution of FANCONI (Zurich). Rabies and the related "mad itch" are described by MOHR (Hamburg) and the contributions on tropical virus diseases, the rickettsial fevers, rare infectious diseases such as erysipeloid, glanders, melioidosis, foot and mouth disease, psittacosis and anthrax, all come from him and other Hamburg workers. The chapters on tropical virus diseases (NAUCK) and rickettsial fevers (ASCHENBRENNER with EYRE [Bonn]) are very complete and clearly written accounts, fully up to date and reinforced with a generous bibliography.

Mohr also writes what is almost a small handbook of its own on the mycotic diseases. There is a short description of laboratory examination, and a full account of morphology and biology of fungi in general and the pathological phycomyces, ascomyces and hyphomyces in particular. The connexion between increasing frequency of moniliasis and penicillin therapy is not yet recognized although the author comments on the higher incidence of mycosis of the lungs in the U.S.A. as compared with Germany.

Detailed chapters on sepsis, on erysipelas and on typhoid and paratyphoid fevers are the contributions of BINGOLD (Munich). The article on sepsis contains an account of antibacterial chemotherapy. This particular field is rather sparingly dealt with, streptomycin therapy occupies less than one page, and chloramphenicol, aureomycin and terramycin are altogether discussed in 14 lines. Angina and diphtheria are described by HOTTINGER (Basle) and the chapter on diphtheria which occupies 112 pages (excluding 12 pages of bibliography) is lavishly illustrated with 79 figures and photographs. Finally GLANZMANN contributes a short chapter on mononucleosis and GSELL (St. Gallen) one of 30 pages on the meningococcal infections.

The second volume is of more particular interest to the reader in the tropics. In 1,000 pages, of which about 140 are devoted to references, are discussed bacillary dysentery (WALTHER, Westerstede), cholera and bartonellosis (NAUCK), brucellosis (LÖFFLER and MORONI, Zurich), leprosy and toxoplasmosis (MOHR), plague (the late Dr. HORMANN), tularaemia (SCHULTEN, Cologne), tetanus (LINDER, Berlin), whooping cough (GLANZMANN), relapsing and rat bite fever (LIPPELT, Hamburg), the leptospiroses (GSELL, St. Gallen), protozoal diseases (FISCHER, Kabul and REICHENOW, Hamburg), diseases caused by worms (VOGEL and MINNING, Hamburg) and arthropods both as causes and carriers of disease (WEYER, Hamburg).

The whole work must be particularly welcome to medical teachers and practitioners in the tropics, and it should be available at some centres where those specially interested will be able to consult any particular chapter. But it is as well to realize that these two volumes cost 374 marks (one £ sterling is equivalent to about 12 marks).

H. Lehmann

NÁJERA, Luis E. **Nomenclátor de las enfermedades transmisibles y símili-transmisibles.** [Nomenclature of Transmissible and "Pseudo-Transmissible" Diseases] 257 pp. 1952. Santa Fe (Argentina): Facultad Hig. y Med. Preventiva. [This review appears also in the *Bulletin of Hygiene*.]

Progress in medical science and in epidemiology has so enlarged the list of recognized diseases, and has added so considerably to the known causal agents, that the existing nomenclature of disease urgently needs both revision and reclassification to bring it into line with modern concepts. Dr. Luiz Nájera's monograph, reviewing the nomenclature of the transmissible diseases, is therefore most timely.

In the first part (pp. 7–66) he sketches the historical background, and sets out his views on the general considerations that apply to the nomenclature of disease and the criteria which should govern the choice of a standard name for a particular disease. In this connexion, he refers to such matters as the use of synonyms, homonyms, neologisms and eponyms, and discusses the linguistic aspects of the problem of unifying medical nomenclature so that it may become internationally acceptable.

The second and major part of Dr. Nájera's monograph (pp. 67–175) consists of an aetiological classification of the transmissible diseases and of diseases that resemble these in their epidemiology (for example, coryza). These pseudo-transmissible diseases he terms "símili-transmisibles", thus introducing a novel point of view in epidemiology. The diseases are grouped alphabetically under ten main headings indicating aetiology. The groupings cover viral, rickettsial, mycotic, bacterial, spirochaetal, protozoal, and helminthic diseases, diseases due to parasitic arthropods, to intoxications, and to doubtful or unknown causes. For each disease he gives the preferred designation in capitals, followed by a list of synonyms. In all, he includes 357 diseases, and over 2,800 synonyms.

For this very extensive list of synonyms Dr. Nájera's monograph is assured a welcome in medical libraries, and from medical historians and editors of medical journals, for diseases have many aliases which frequently make their identification difficult. Who, for instance, would suspect that "the new acquaintance" or the little French "cocotte" once answered to the name of "influenza", or would identify the Spanish "Don Símon" with "dengue"? Brucellosis (undulant fever) is an example of the confusion caused by many local synonyms, for it has been variously named Malta, Mediterranean, Barcelona, Cartagena, Corfu, Cretan, Cyprus and Gibraltar fever, and this list of its geographical appellations is not exhaustive.

The third part (pp. 179–245) forms an alphabetical index to all the names and synonyms which appear in the preceding section, and greatly facilitates reference.

Finally Dr. Nájera gives a bibliographical list of the main works that he has consulted in the preparation of his monograph. The whole publication makes a notable contribution towards the long-term purpose of greater uniformity in medical terminology.

R. L. Sheppard

LANGERON, M. **Précis de mycologie. Mycologie générale, mycologie humaine et animale, techniques.** [A Precis of General, Human and Animal Mycology] 2nd Edition, revised and enlarged by R. VANBREUSEGHEM. Preface by Edmond SERGENT. pp. ix+703, 461 figs. 1952. Paris: Masson et Cie, 120, Boulevard Saint-Germain, VI^e. [4800 *fr.* paper cover; 5400 *fr.* cloth boards.]

The death of Maurice Langeron in 1949 was a grievous loss to both medicine and mycology. Langeron, who was an indefatigable writer, did, however,

leave a double memorial to himself in the *Précis de microscopie* (7th edition, 1949) and the *Précis de mycologie*, 1945, two works in which he codified many of his ideas. The *Précis de mycologie* has been out of print for several years and this new and enlarged edition is most acceptable.

The second part of the new edition (pp. 367–447 ; chapter VIII of the old), which is devoted to techniques, is in effect the mycological supplement to the latest edition of the *Précis de microscopie*. Many useful methods, including a number of particular interest to medical mycologists, are brought together as in no other work of reference. The first part (pp. 3–363) is Langeron's rather individual account of general mycology which, though fascinating to the trained mycologist, would prove rather heavy going for the average medical reader who acquired the book for the third part (pp. 453–668, the old chapter IX), a new treatment of the principal mycoses of man and animals by Dr. Vanbreuseghem who has edited and revised the earlier parts with the help of Langeron's interleaved and annotated copy of the first edition.

Vanbreuseghem is well known as an active worker in the field of tropical medical mycology and this review of mycoses is comprehensive and well balanced. The diseases are dealt with in alphabetical order from actinomycosis to sporotrichosis with the exception that the nocardioses are quite naturally united with the first while moniliasis and torulosis are grouped together as "*les levuroses*", an association which is not very natural either mycologically or clinically. Each mycosis is treated similarly under a series of standard headings which include definition, history, geographical distribution, aetiology, the pathogenic agent, symptomatology, histopathology, treatment, prognosis, and differential diagnosis and for each there is a useful select bibliography. Illustrations are fewer than in the earlier sections of the book but they are usually well chosen and informative. Comment on details of this most useful review would be merely trivial and so it only remains to welcome this addition to the literature of medical mycology and to suggest that when revision is needed its issue as a separate publication merits serious consideration. *G. C. Ainsworth*

HOLSTEIN, M. H. **Biologie d'*Anopheles gambiae*. Recherches en Afrique-Occidentale Française.** [Biology of *Anopheles gambiae*. Studies in French West Africa] *World Health Organization Monograph Series No. 9.* 176 pp., 22 figs. 1952. Geneva : Palais des Nations. [10s. ; $2.00 : Sw.fr. 8.–.]

This monograph is in French with summaries in French and English. It contains many references to work on *Anopheles gambiae* by other investigators in other parts of Africa and South America and, incidentally, to other species of *Anopheles*. Results and conclusions are discussed in the appropriate sections and compared with the author's own observations over a period of two years spent in French West Africa and especially in the region of the Upper Volta with headquarters at Bobo-Dioulasso. Illustrations include maps of the area, drawings of important morphological features and graphs demonstrating biological points ; there are also more than 30 tables of data. The subject is discussed under the following heads : climate and geography ; research methods ; morphology ; biology ; malaria transmission and the races of *A. gambiae*.

Laboratory rearing was not so difficult in the winter but it was found impossible to keep adults alive for more than 2 or 3 days without constant supervision. Even so it was rarely possible to keep the cultures going for

more than 4 generations. There are notes on other techniques such as the preparation of parts for microscopical examination and the performance of the precipitin test.

The biology of the early stages is dealt with very fully. Special reference is made to two groups of breeding places which deserve more attention ; one occurs among logs which after being floated down the river are stacked on shore for long periods awaiting shipment ; the other is found in wells which in the dry season may be the only places where a female *A. gambiae* can deposit her eggs.

Many attempts have been made to classify the breeding places of mosquitoes ; some of these systems are criticized. So far as *A. gambiae* in the Upper Volta region is concerned, the author's classification of breeding places is based on the presence or absence of vegetation in the water. In " organic " breeding places, which contain vegetation and in which the content of organic matter, expressed as milligrammes of oxygen taken up per litre, is more than 1·25, the larvae of *A. gambiae* are often accompanied by those of other species such as *A. funestus, A. pharoensis, A. coustani, A. squamosus* and *A. rufipes*. In " inorganic " waters, with less than 1·25 mgm. of oxygen per litre, there is no vegetation, alive or dead, and *A. gambiae* is usually the only larva present, though occasionally *A. rufipes* or *A. nili* may be seen.

It is well known that the duration of the life cycle of *A. gambiae* is extremely variable ; and many figures are quoted. In giving his own observations, the author concludes that optimum development takes 10 days with a water temperature of 25° to 26°C. and an organic matter content of less than 1·25 mgm. per litre : this last point is emphasized. Some experiments are recorded with " organic " and " inorganic " breeding places ; in the former, the duration of life was found to be from 12 to 20 days while in the latter development was accomplished in 7 to 11 days.

One of the characteristic features of *A. gambiae* breeding places is their high temperature. Larvae were found in natural waters at 41·8°C. and in the laboratory adults were raised from larvae which had been kept for 12 hours in water at 41·5°C. It was also shown that eggs will hatch after exposure to a temperature as low as 6·6°C. for as long as 8 hours. Other experiments showed that the resistance of the eggs to desiccation depends chiefly on the substratum and it is suggested that in nature survival is dependent not so much on the amount of rain as on the length of the interval between rains. Accumulated evidence from field and laboratory illustrates the facility of this species to adapt itself to different conditions in its early stages, and suggests that this adaptability may contribute to some extent towards making it the dangerous mosquito that it is, and apparently accounts for its rapid dispersion.

Many of the experiments on adults confirm the findings of previous workers ; but in French West Africa, at least, the repopulation of an area during the winter is due, partly if not mainly, to the presence, during the dry season, of aestivating females. Temperatures in this region rarely fall below 11°C. and only for short periods. Females caught in the dry season possess developed ovaries but the eggs are not laid. They will feed if given the opportunity and they contain no fat. In the laboratory such females can live without food for 70 days but they deposit their eggs when the relative humidity exceeds 80 per cent.

The figures are given for the sporozoite and oöcyst infections found among more than 12,000 dissections. It seems likely that *A. funestus* is responsible for the average endemic state of malaria in this region and *A. gambiae* for epidemics and the high endemicity of certain areas.

The morphological and other differences between *A. gambiae* and *A. melas* are described and illustrated. It is concluded that *A. melas* tends to be exophilic and is probably preferably zoophilic. The author expresses a strong belief that in this part of Africa there are two biological races of *A. gambiae* and that these two races exist in other parts of the continent. One is described as paucidentate, with a maxillary index of 13·5 (10–16), is mainly endophilic and anthropophilic and breeds preferably in "inorganic" waters. The other is multidentate, with a maxillary index of 15 (12–19), exophilic, zoophilic and breeds in waters with a high organic matter content.

In the appendices there is a list of places from which *A. gambiae* has been recorded; sporozoite indexes for Africa and Brazil are also given as well as keys for the identification of the adults and larvae of 9 common species of West African anophelines. The bibliography contains nearly 400 references.

The book is full of fact and will be read not only for information and reference but because it will undoubtedly provoke further investigation in other parts of Africa into such matters as the existence of *A. gambiae* races, the factors affecting hibernation and aestivation, the relationship between the maxillary index and anthropophily and the nature of the breeding places. Such enquiries may help to explain some of the disappointments recently experienced in attempts to control *A. gambiae* with the new insecticides. *H. S. Leeson*

SIMONS, R. D. G. Ph. [Edited by.] **Handbook of Tropical Dermatology and Medical Mycology.** Vol. 1. pp. xvi+845, 587 figs. 1952. Amsterdam: Elsevier Publishing Co. London distributors: Cleaver-Hume Press Ltd., 42a, South Audley St., W.1. [£10 for 2 vols., separate vols. not available.]

While an understanding of skin disease is helpful to the physician in temperate climates, it is essential to his colleague in the tropics. There are very few tropical diseases which may not at some stage involve the skin. In many of these the skin manifestations predominate, in others they are less obvious, but a correct diagnosis may devolve on the accurate interpretation of comparatively subtle cutaneous changes.

There was therefore a great need for a comprehensive work on dermatology suitable for the practitioner in the tropics. In the two volumes which comprise the Handbook of Tropical Dermatology and Medical Mycology, the Editor, Dr. Simons, sets out to supply this need, and he has gone to endless pains to achieve his object.

Over 80 specialists have collaborated with him, and the result is a textbook which covers not only the field of dermatology, but the bulk of tropical medicine as well.

The opening chapter is a survey of tropical dermatology as a whole. After a historical introduction the Editor gives a concise alphabetical list of the commoner tropical skin diseases. Some of his opinions are obviously controversial and many would disagree with his tentative suggestion that rosacea might be a tuberculid or that the seborrhoeic state is a result of malnutrition. The remainder of this chapter is largely devoted to an attempt to unravel the tangle of tropical nomenclature which has produced a local name for so many tropical diseases. One learns, for example, that there are no less than 19 varieties of itch, innumerable types of pox and boil, and such tiresome appellations as jittery, boomerang, deduk, black, rose, Barbados and even Castellani legs. In this jungle of nomenclature, a guide is particularly useful; perhaps a bulldozer would be even more so.

The remainder of this section is devoted to the dermatoses of children and the disturbances of pigmentation.

The second section deals with diseases due to protozoa, spirochaetes and related organisms. This section includes chapters on dermatological syphilis in non-whites, yaws and cutaneous leishmaniasis ; it concludes with a very useful one on cutaneous amoebiasis.

The third section covers diseases due to bacteria, and contains chapters on tropical ulcers, cutaneous tuberculosis, and plague. Leprosy takes up over 100 pages, and several authors have contributed chapters on it, with some inevitable overlapping. One would have liked a little more space devoted to treatment, with an evaluation of other drugs besides hydnocarpus oil and the sulphones.

Diseases due to cocci are dealt with in the 4th section, and rickettsiae and viruses in the 5th, while the final one is concerned with the miliaria group of dermatoses and tropical acne.

The text of this volume comprises over 800 pages illustrated by nearly 600 photographs. The reviewer understands that a second volume is appearing shortly dealing with the remainder of tropical dermatology. If it is of the same standard as the present one the two volumes will have fulfilled their publisher's claim of " covering every tropical skin affection with a completeness never before achieved in a single work ". *H. T. H. Wilson*

von BRAND, Theodor. **Chemical Physiology of Endoparasitic Animals.** pp. x+ 339, 16 figs. 1952. New York : Academic Press Inc., 125 East 23rd Street, 10, N.Y. [$7·50]

As pointed out in the preface the subject matter dealt with in this volume has been largely developed during the present century and with increasing momentum during the war years. It was essential that the ground work be laid by those interested in other aspects of the subject and this delayed the physiological studies which, moreover, frequently require a specialized training and a working knowledge of other subjects, including biochemistry. In a critical review of the pertinent literature a wealth of facts previously scattered in many journals and embracing all aspects of the subject has been presented to the reader in digestible form by a writer with an exceptional knowledge of the subject. The review is not claimed to be exhaustive, an impossible task within the narrow compass of some 300 pages ; but a good general survey is given, accompanied by an imposing list of references at the end of each chapter, which should prove of special value to workers in particular fields. Scattered throughout the text are also a number of informative tables which serve a similar purpose. The book is divided into 3 parts which deal with the Chemical Composition of Endoparasites, Metabolism of Endoparasites, and Chemical Host-Parasite Relationships, respectively. Each part is sub-divided into a number of chapters. In Part I inorganic substances, carbohydrates, lipids, proteins, physiologically active substances, pigment and toxins are discussed. It is clear that much experimental work is still required before anything like a complete picture of the subject is formed. The statement on p. 14 line 12 that " no quantitative polysaccharide determinations are available for parasitic protozoa " does not apply to malaria parasites. The contents of Table 14 (p. 40) indicate that in this era of chromatography surprisingly few determinations have been made of the constituent amino acids of parasites.

Part II is the longest and probably the most interesting part of the volume. The author has himself made considerable contributions to some of the subjects under discussion, which concern metabolism of water, inorganic substances,

carbohydrates, lipids, proteins, and gaseous exchanges; biological oxygen relationships and growth requirements of parasites are also dealt with. In regard to inorganic substances interest has centred chiefly on phosphorus, partly because phosphorylation reactions are of paramount importance in the transfer of energy during cellular metabolism and partly for the reason that radio-active phosphorus so widely used in tracer studies has put a valuable tool in the hands of the experimenter. Because of its importance and the fact that it has been most intensively studied, carbohydrate metabolism is dealt with at greatest length. The available data show that few of the parasites studied oxidize sugar completely and prefer aerobic and anaerobic types of fermentation which are uneconomical so far as the production of energy is concerned. In some cases, however, a purely oxidative pathway for breakdown of hexoses has been described. The statement on p. 107, line 8 from the end, that " Some lactic acid is produced by most parasites studied, with the exception of the bloodstream form of the pathogenic trypanosomes " would appear to be contradicted by the data given in Table 22 on the following page. With regard to protein and lipid metabolism relatively few data are available. Some recent results on phospholipid synthesis by trypanosomes and malaria parasites are, however, described. Whereas synthesis of protein can be accomplished by certain free-living forms from inorganic nitrogen in presence of an organic carbon source, parasitic forms require organic compounds of nitrogen of undetermined complexity for a similar purpose. Notable advances have been made in studies on the growth requirements of parasitic flagellates, malaria parasites and helminths, of which certain species can now be maintained in pure culture, but little or no progress has been reported in similar studies on amoebae, which survive only in presence of bacteria.

In Part III the effect of the nutritional status of the host on tissue and intestinal parasites and *vice versa* is discussed. An interesting practical application of the effect of diet on infections with *E. histolytica* has been made in the case of certain laboratory animals so that although refractory to infection in the absence of the suitable diet, with it good infections can be obtained for the purpose of drug-screening tests. While the nutritional status of the vertebrate host may be markedly influenced by parasitic infections reason for such disturbance is not always apparent. In the case of certain intestinal worms it has been reported that substances are produced which prevent normal functioning of the host's digestive enzymes and thus give rise to nutritional disorders. In discussing these and other disorders the importance of functional interference is emphasized rather than that due to other causes. The final chapter deals with Parasite Physiology and Chemotherapy. The merits of what had been described as "a rational approach to chemotherapy" are recognized but the greatest successes have so far been obtained by the older empirical methods. The early work of McIlwain (1943), who used the rational approach to chemotherapy by blocking nutrients, would have been worthy of mention in this connexion. The mode of action of anti-protozoal and anthelmintic drugs is briefly dealt with and finally the problem of drug resistance, the characters of which and the mechanism of whose production are described. In the case of parasitic protozoa, especially malaria parasites and trypanosomes, drug resistance has proved of great practical significance, but contrary to the author's statement it does not appear that any unequivocal evidence has been obtained for a similar resistance in the case of *E. histolytica*.

The volume is provided with an author and subject index. Remarkably few typographical errors were found. On p. 2, line 1, ' date ' occurs for ' data '; on p. 14, line 23, Lillie 1941, given correctly earlier on the same page, should read Lillie 1947 ; on p. 130, paragraph C, line 12, ' able ' should read ' capable ' ;

on p. 202, line 10, *S. oncopelti* is given as *S. oncepelti*. A poor bag ! The volume should be of great value to all laboratory workers in this field.

The publishers are to be congratulated on their effort also. The printing is excellent, on good paper, and the volume is enclosed in strong covers.

J. D. Fulton

DIAS, Caio Benjamin. **A síndrome hépatico-esplênica na esquistossomíase mansônica. Contribuição ao seu estudo, baseada em 22 casos clínicos, dos quais 13 submetidos à esplenectomia.** [The Hepato-Splenic Syndrome in Schistosomiasis mansoni] [Thesis.] 449 pp., 61 figs., 15 graphs & 11 folding diagrams. 1952. Belo Horizonte, Minas Gerais, Brazil.

By their frequency and gravity, says the author in his preface, the liver and spleen complications constitute a, if not the, most important factor in helminthology as a cause of invalidism and even death in a large part of the Brazilian State of Minas Gerais. The study under review is based on 22 cases, in 13 of which splenectomy was performed.

In investigating the condition, in the present as well as in the past, there are certain difficulties in diagnosis because entries have been made under such headings as Banti's syndrome, congestive splenomegaly with sclerosis, and splenomegalic cirrhosis. *Schistosoma mansoni* infestation is largely responsible for " splenomegalic cirrhosis ", especially in the north-east and central areas where schistosomiasis is endemic.

In the present thesis the author designs to treat of the less advanced stages when treatment may prevent the development of the disease or lessen its effects and where the operation of splenectomy may be expected to give good results. He refers to J. A. MEIRA's professorial thesis, with an almost identical title, a work of over 600 pages on the same subject which was reviewed in this *Bulletin* recently [1952, v. 49, 737]. He gives full acknowledgement of the help given by his colleagues, surgeons, pathologists, photographers, radiologists and others.

The work is divided into two parts : 1. The pathological aspects of the liver and spleen in *S. mansoni* infestation. 2. A clinical study. The former of these comprises 4 chapters dealing with the pathogenesis of the lesions in liver and spleen ; the latter with the general clinical aspects, the blood changes, the liver functions, haemorrhages, epistaxis, haematemesis and melaena, and remarks on treatment. This is followed by detailed records of the 13 patients who underwent splenectomy, giving in each case the history of the disease and of previous illnesses, the results of physical examination, laboratory tests of the faeces for parasitic infection, of the blood, of liver functions, with remarks on the evolution of the disease and the treatment adopted. Special attention is given to extirpation of the spleen and the effects of this on the blood and hepatic functions. The macroscopic and microscopic changes in the liver and spleen tissues are described and illustrated, the histology of the liver from specimens obtained by viscerotomy. There are 31 excellent photomicrographs of the liver tissue changes and 10 of the spleen.

The author brings all his facts together in a very clear summary which may be epitomized as follows : Though the changes in liver and spleen are due, primarily, to infestation by *S. mansoni*, they seem later to take on an autonomous activity and thus may be regarded as a " complication " of the infestation ; hence the older terms of Egyptian splenomegaly, Banti's syndrome, and splenomegalic cirrhosis due to schistosomiasis are none of them really adequate and the author proposes " hepato-splenic syndrome " as better. Characteristic changes in the spleen are congestion and sclerosis. Though hepatomegaly precedes enlargement of the spleen, it is the splenic condition which in the long

run and in the later stages predominates and this may be held to account for the benefit resulting from early splenectomy. The spleen changes are secondary to the hepatic because the spleen remains outside the biological influence of the parasite and even when the parasites are no longer found in the liver, pseudo-tubercles and other changes indicate their former presence, *e.g.*, the periportal and interlobular fibrosis, the local eosinophilia, particularly in the sinusoids, and retrogressive changes in the parenchyma cells, the "*células claras*" (clear cells).

From the clinical standpoint, the splenomegaly is graded according to Hackett's schema ; of his 22 cases 10 were of grade IV, 7 of grade III, and 5 of grade II. The liver was large enough to be palpable in all but one, in which it was small and retracted. Signs of "hypersplenism" were evidenced in the blood of 19 by leucopenia involving polymorphonuclears, lymphocytes and monocytes, by anaemia, normocytic or, less often, microcytic, with hypochromia (but this might be ascribed, in part at least, to hookworm infestation and haemorrhages) and thrombocytopenia. Liver function tests included cephalin-cholesterol, thymol turbidity, urobilinogen, gamma-globulin ; also blood sedimentation rate, the Takata-Ara test and bilirubinaemia. Epistaxis occurred in 9 patients, haematemesis in 12 and oesophageal varix was found in 14.

The account of treatment is divided into : 1. Causal—the use of antimonials for the helminthiasis, and 2. Surgical ; in the main splenectomy with, in some cases, spleno-renal anastomosis. Splenectomy relieves portal stasis and the liver enlargement is arrested and may to some degree recede. This result is not yet satisfactorily accounted for ; it may be due to removal of hypersplenism, relief of portal stasis, or to some inter-relation, physiological and pathological, between the liver and the spleen and the reticulocytic system, or to a combination of these.

Judged by the comparatively small number of cases in which splenectomy was carried out, success may be attributed to the fact that the operation was performed at a stage when the hepatomegaly was not very great and the helminthic infestation had previously been dealt with. Only one of the 13 patients operated upon died, death being due to mesenteric venous thrombosis. Of the other 12, one had been under observation for 6 years and only 4 for less than one year, and none has, so far, relapsed and all have been restored to full physical capacity.

A terminal bibliography and list of references, 272 in all, includes papers dating from Banti's work on splenic anaemia in 1883 down to 1951. Due credit is given to investigators from many countries—British, German, Egyptian, French and Italian, as well as from North and South America.

Though, naturally, when two authorities of repute, Alves Meira and Benjamin Dias write large works on the same subject, their recordings must necessarily cover much the same ground and tend to overlap, nevertheless the present and that of Meira do not coincide. The former bases his studies on a large number of cases, 65, in 34 of which details of the histopathology of the liver and spleen are recorded, as compared with Dias's 22. Meira deals almost entirely with the historical and pathological aspects whereas Dias concerns himself more with the clinical side and treatment. Thus, the two are inter-supplementary and anyone who has access to the two works may rest assured that from them he can learn "all that he desires or deserves" on the effects of *Schistosoma mansoni* on the liver and spleen and the results of early splenectomy. *H. Harold Scott*

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